Spillovers and conflict in collective bargaining

Experimental and survey studies

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Introduction

1.1 Introduction

In 2008, the new collective agreement for the Dutch metalworking and electrical engineering (the so-called 'large metal') industry stipulated a 7.75% wage increase. In subsequent negotiations on the separate metal and engineering industry (the so-called 'small metal') collective agreement, the trade unions threatened strikes after employers refused their wage increase demands. According to the employers, the conflict emerged because the trade unions were unduly basing their demands on the metalworking and electrical engineering wage increase without taking into account the differing economic situations in the two sectors (Het Financieele Dagblad, 2008). Five years later, it was the metal and engineering industry that first settled on a new collective agreement. The settlement, a 3.5% wage increase, was preceded by a number of strikes and was seen as a trade union victory. The successful strikes subsequently inspired the trade union negotiators involved in ongoing negations on the new metalworking and electrical engineering collective agreement, which led these negotiators to threaten strike actions to obtain their demands (Leeuwarder Courant, 2013).

These examples illustrate that conflict in one collective bargaining event is influenced by information about other collective bargaining events. In the academic literature, patterns of influence between collective bargaining events are commonly referred to as 'information spillovers' or simply 'spillovers'. Although much is known about the impact of spillovers on bargaining *outcomes*, such as wages[1], the way that spillovers affect *conflict* in collective bargaining is still not well understood. The relevant causal mechanisms, the conditions under which they operate, and their impact on conflict remain largely unknown.

The present book addresses the question of the impact of spillovers on conflict in collective bargaining.[2] The central aim of this book is to study whether, how, and under what conditions spillovers affect conflict in collective bargaining. The book has two parts. First, I test various proposed mechanisms for spillovers and their impact on conflict with the aid of bargaining experiments. Second, I analyze survey data collected among collective bargaining negotiators in the Netherlands to study the impact of spillovers on bargaining behavior and conflict in bargaining.

1 See for instance Eckstein and Wilson (1962); McGuire and Rapping (1968); Mehra (1976); Oswald (1979); Swidinsky and Wilton (1980); Vroman, (1982); Lacroix and Dussault (1984); Drewes (1987); Addison and Chilton (1988); Bremmels and Zaidi (1990); Ready (1990); Prescott and Wilton (1991); Budd (1992; 1997); Breitung and Meyer (1994); Erickson, (1996); Greenbaum (2002); Marshall and Merlo (2004); Traxler, Brandl and Glassner (2008); Calmfors and Seim (2013); Chistofides, Ingram, Rickman and Wadsworth (2013); Camarero, D'Adamo and Tamarit (2014).

2 The thesis is thus concerned with bargaining over collective agreements, not with bargaining process within the context of (inter)national bi-partite or tri-partite interaction such as for instance central agreements.

1.1.1 Scientific relevance

Labor conflict[3] has been a subject of substantial interest in multiple disciplines and sub-disciplines of the social sciences. The subject of labor conflict has been extensively studied particularly in economics and sociology.[4] For the discipline of economics, labor conflict as it occurs in collective bargaining is of interest because collective bargaining is an important institutional factor that affects the 'price of labor' and therefore the labor market. In addition, collective bargaining represents an empirical application of economic decision making as described in the more general field of economic bargaining theory. For sociology, labor conflict represents a cogent empirical domain for the study of societal (class) conflict, and the outcomes of labor conflict affect social inequality.

As I describe in more detail in section 1.2 of this introduction, the two disciplines have differing assumptions about labor conflict and, consequently, differing approaches to understanding the effects of spillovers on conflict in collective bargaining. The economics approach draws on bargaining theory and assumes that conflict is costly and therefore irrational. The economics approach must be further subdivided into two different approaches, which I refer to as the mainstream economics approach and the behavioral economics approach. The mainstream economics approach assumes that negotiators are rational but suffer from information problems. This approach suggests that spillovers improve information and, in this way, largely reduce conflict. By contrast, the behavioral economics approach relaxes the rationality assumption about negotiators and views them as fundamentally concerned with achieving fairness and equity in bargaining. This approach suggests that information about other bargaining events influences negotiators because their preferences are reference-dependent and that this influence is subject to cognitive biases. In this approach, spillovers are thought to potentially increase the divergence between negotiators and thus to actually increase conflict. The sociological approach draws on diffusion theory to explain spillovers and assumes that conflict can actually be rational because the cost of conflict can be outweighed by its benefits. This approach suggests that spillovers inform negotiators about the potential benefits of conflict and thus increase conflict.

3 'Labor conflict' here refers all types of distributional conflicts between employees and employers, of which conflict in collective bargaining is a specific example. I use this broader term because, while sociological literature on labor conflict offers highly valuable insights, it has largely neglected to engage specifically with conflict in collective bargaining. I further elaborate on this point in section 1.2.

4 It is also a studied extensively within political science, however, studies within political science and sociology are highly similar. Hence, I treat these two disciplines as synonymous. Much of the relevant academic discussion has also taken place within the multidisciplinary field of industrial relations, which draws on both sociology and economics, as well as on several other disciplines.

Although each of these three approaches provides important insights into the question of the impact of spillovers on conflict in collective bargaining, each invokes different assumptions, mechanisms, conditions under which these mechanisms operate, and, consequently, differing predictions about the influence of spillovers on conflict in collective bargaining. It is therefore an important task to integrate and test these different approaches to improve our understanding of whether, how and under what conditions spillovers increase or decrease conflict in collective bargaining.

1.1.2 Societal relevance

Understanding how spillovers affect conflict in collective bargaining is important given the far-reaching impact of collective agreements on the well-being of employees, the competitiveness of firms, and society at large. Despite a general trend of declining trade union membership (cf. Visser, 2006), across OECD countries, well over half of all employees on average are covered by a collective agreement (Visser, 2011). This is partly because national legal frameworks either automatically make collective agreements binding for non-unionized workers and workplaces, or this is achieved through extension practices. Hence, collective bargaining determines the terms and conditions of employment for a large number of employees.

Labor conflict continues to play a major part in collective bargaining. Although labor conflict, as evidenced by strikes, has become less common (Piazza, 2005; Scheuer, 2006; Brandl and Traxler, 2010; Godard 2010), this downward trend now appears to have halted, and conflict levels have relatively stabilized (Scheuer, 2006). At the same time, there appear to be considerable and repeated short-term peaks in the intensity of labor conflict (Gall, 2012).

Moreover, Kelly (1998) argues that labor conflict follows the 'long wave' (i.e., Kondratiev waves) of economic development. Hence, we will likely witness a general resurgence of conflict in the future. Currently, the general worsening of employment relations in the wake of the 2008 financial crisis is argued to have increased the risk of renewed strife in employment relations (ILO, 2013). Recent studies point toward increases in industrial conflict in some developed countries (e.g., Brym, Bauer and McIvor, 2013) as well as in developing countries such as China (e.g., Cheng, Ngok and Huang, 2011). It is also becoming increasingly evident that a singular focus on strike statistics leads to substantial misconceptions about the true extent of labor conflict (Franzosi, 1989; Hebdon, 2005; Godard, 2011, Tanguy, 2013; cf. Achterkamp and Akkerman, 2003). Against this background, a better understanding of the mechanisms by which spillovers affect conflict in collective bargaining and the conditions under which they operate is of significant societal interest.

In the remainder of this chapter, I first clarify the use of key terminology that will be used. Then, I discuss different approaches to labor conflict and how these different approaches have led to the proposition of different theoretical mechanisms for

spillovers and, consequently, to different predictions about the influence of spillovers on conflict. In section 1.5, I formulate the central research question that is addressed in this book and conclude by formulating specific research questions that are studied in the empirical chapters of the book.

1.1.3 Terminology

I use the terms 'negotiation', 'negotiator', 'negotiating' and 'bargain', 'bargainer', and 'bargaining' interchangeably in this study.[5] I refer to the process of negotiations for any particular collective agreement between representatives of employers and employees as a '*negotiation*' or '*bargaining event'*. Bargaining events start with an initial demand by union(s) or an initial offer of employers, and they end with the signing of an agreement once a bargaining outcome is reached. I refer to the set of actors that negotiate over a collective agreement (i.e., trade unions and employers or employers' associations) as a '*bargaining unit'*. Collective agreements are usually in effect for a fixed period, after which a new agreement must be reached. Hence, a bargaining unit will usually conclude multiple collective agreements in multiple successive bargaining events.

I use the terms '*information spillovers*' and '*spillovers*' interchangeably. The use of these terms merits further discussion and clarification. Traditionally, the term 'spillovers' in labor research has been associated with potential patterns of influence between different bargaining units, particularly patterns that result in observed similarities between bargaining units in the wages to which they agree.[6] In this context, the term 'spillovers' has been applied to both the process of bargaining units influencing one another and observed similarities in wages (the assumed result of this influence).

However, the understanding of spillovers as patterns of similarities in wages has four important theoretical drawbacks and methodological implications. The first drawback is that this understanding assumes a one-to-one relationship between patterns of influence between bargaining units and outcomes of bargaining, specifically wages, in these bargaining units. This assumption neglects the fundamental role of the bargaining process in determining bargaining outcomes. Although the bargaining behavior of any of the negotiators in a bargaining unit may change under the influence of information about negotiations, none of the negotiators can unilaterally determine the outcome of the inherently joint decision-making

5 While some scholars (e.g. Flanders, 1969) have highlighted semantic differences between these terms, there is no agreement about what such differences would entail, nor would the analysis presented in this book suffer from their omission.

6 Besides 'spillover', such patterns have also been referred to as 'pattern bargaining', 'wage leadership', 'wage imitation' and 'wage contours', although these terms have also been applied to other forms of interdependencies in collective bargaining.

process that a negotiation represents. Hence, the way the bargaining process translates the impact of spillovers on individual negotiators into bargaining outcomes must not be taken as a given but should be treated as a question to be studied.

The second drawback of defining spillovers as patterns of bargaining outcomes singularly in terms of wages is that this understanding neglects the fact that spillovers also affect conflict in collective bargaining. Spillovers not only influence wage agreements, but they can also influence the probability that a bargaining unit will experience a strike, a bargaining impasse or some other manifestation of conflict.

Third, equating patterns of influence between bargaining units to observed similarities in bargaining outcomes assumes that any pattern of influence will always unequivocally entail similarities. However, this observation is not consistent with theories of spillovers, which predict patterns of influence between bargaining events but often do not actually predict this influence resulting specifically in observed similarities.

Fourth, by conceiving of spillovers as observed empirical patterns in bargaining outcomes, there is no distinction between two very different types of causal effects: direct influence (i.e., information about one negotiation directly affects another) and indirect influence (i.e., outcomes in one negotiation change the (economic) context in which another negotiation takes place).

In this book, I will only study direct influence. I use 'spillovers' to mean the direct impact of information about other collective bargaining events on the bargaining behavior of individual negotiators. The source of this information can be negotiations that have occurred in other bargaining units or previous negotiations within the own bargaining unit. As shorthand to differentiate these two types of sources of information that can generate spillovers, I refer to spillovers between different bargaining units as '*horizontal spillovers*' and spillovers that run from past to present bargaining events within the same bargaining unit as '*vertical spillovers*'.[7]

1.2 Research on spillovers and conflict in collective bargaining

Our current understanding of the impact of spillovers on conflict in collective bargaining is limited. One of the factors that particularly hampers progress is the lack of integration of knowledge produced by the different scientific disciplines. Although research in both economics and sociology offers relevant explanations, these explanations appear contradictory, and little effort has been made to understand how

7 Thus, the use of 'vertical' here does not refer to any hierarchical pattern of influence, such as influences across different levels of bargaining in multi-leveled bargaining systems.

they relate to each other. In this thesis, I therefore aim to integrate and test these different explanations. Before discussing the literature on the influence of spillovers on conflict in collective bargaining, I first provide a brief overview of the economic and sociological literature on labor conflict in general. This overview will show how different strands within this literature conceive of the nature of labor conflict differently. I confine the overview to those developments in the literature that are relevant to understanding these different views. Then, I review the literature on the relationship between spillovers and labor conflict, which broadly consists of two strands: 1) bargaining-theoretic studies of the impact of spillovers on conflict in collective bargaining, which mostly developed within economics and employment relations literature and can be further divided into the mainstream approach and the behavioral approach; and 2) analyses of diffusion and contagion in labor conflict, which have been predominantly confined to sociology.

1.2.1 Labor conflict: a brief overview of the literature

Economics

A defining insight in the study of labor conflict was articulated by the economist John Hicks (1932) in *The Theory of Wages*. Hicks developed an economic bargaining theory of wage determination based on bilateral (i.e., union-firm) negotiations (cf. Pigou, 1905; Zeuthen, 1930) in which each party[8] rationally weighs the expected cost of conflict against the cost of concession. Because conflict (e.g., strikes) always entails cost to both parties, it seems to defy rationality because both parties would be better off immediately agreeing to the eventual outcome. This insight, known as the 'Hicks paradox', has been the driving force of virtually all theoretical development on this subject within economics. Hicks' own solution to the paradox was twofold. Some conflicts, according to Hicks, arise simply because unions wish to maintain their organizational capacity to inflict costs on employers and to occasionally reassert their power. However, Hicks argues, much more importantly, the majority of conflicts are a result of the negotiators' failure to correctly assess the relative costs of conflict and concession. Hence, Hicks contends that 'the majority of actual strikes are doubtless the result of faulty negotiation' (Ibid., p. 146) and that 'adequate knowledge will always make a settlement possible' (Ibid., p. 147). Conflict is thus predominantly seen by Hicks as a result of negotiators' inadequate information, which leads them to misinterpret their opponents' position. In his view, considerations of the need to maintain bargaining power through organizational capacity play only a limited role.

In contrast, Rees (1952) explained variations in labor conflict as resulting from changes in bargaining power. He based this explanation on the commonly observed

8 i.e. the trade union and the firm.

unison movement of strike activity and the business cycle. Rees argued that rises in the business cycle imply increased employment and market expansion, which shifts the relative bargaining power toward unions. When unions have more bargaining power, strikes are more likely to be successful. Therefore, conflict is more likely when conditions favor unions. From the perspective of mainstream economics theory, however, changes in bargaining power by themselves can offer no explanation for conflict. Any such change should result only in different but peaceful settlements that are more favorable to the party that sees his or her power over the other increase (Mauro, 1982; Cousineau and Lacroix, 1986; Gramm, 1986; cf. Martin, 1992). Thus, changes in bargaining power leave Hicks' paradox unsolved, and such theoretical explanations gained limited traction within economics. Consequently, the empirical analysis of conflict in collective bargaining within economics was mostly based on the Hicksian framework; that is, it developed and tested bargaining theories that sought to explain why conflict occurs despite its implied irrationality by reference to inadequate information.

A highly influential study in this vein was conducted by Ashenfelter and Johnson (1969), who analyzed strike activity with aggregate US industry data and were the first to employ sophisticated econometric models. Ashenfelter and Johnson proposed that although union and firm negotiators are rational and fully informed and hence are able to avoid conflict, the union's rank-and-file lacks adequate information about the firm's ability to meet their demands, which pressures unions into calling strikes. Thus, although Ashenfelter and Johnson assume fully informed rational negotiators, their theory can solve Hicks' paradox only by introducing a third actor, the union rank-and-file, which has incomplete information. However, this assumption of fully informed negotiators but uninformed rank-and-file workers has been criticized for being unrealistic (Shalev, 1980; Franzosi, 1989). A second point of criticism was Ashenfelter and Johnson's use of aggregate data to test what are essentially micro-level theories (Stern, 1978; Mayhew, 1979; Shalev, 1980; cf. Wheeler, 1984; Gramm, 1986).

Subsequent studies turned to bargaining models that assumed that the union and firm negotiators themselves suffered from information problems and increasingly analyzed disaggregated (panel, i.e., longitudinal) data. These studies sought to develop (formal) bargaining models that specified how conflicts result from the bargaining process. The resulting bargaining models were then tested against the bargaining unit-level data that became available in this era, particularly for the US and Canada.[9] For instance, Mauro (1982) analyzed a panel of US bargaining units. His bargaining model proposed that negotiators use information about external factors to improve their information. In this model, strikes occur when union and firm negotiators arrive at divergent bargaining positions because they are influenced by external

9 For further related empirical studies, see also Gramm, 1986; Tracy, 1986; Gunderson, Kernan and Reid, 1986; Vroman, 1989.

factors (e.g., price indexes, employment rates) to improve their information. Cousineau and Lacroix (1986) analyze a panel of Canadian bargaining units in manufacturing. Their model suggests that is not so much that negotiators use different external factors as it is the volatility, and hence the degree of uncertainty, that these factors exhibit that affects the extent of informational problems and, hence, strike activity.

A somewhat different explanation for conflict is proposed by Reder and Neumann (1980). They argue that although information problems between negotiators indeed lead to conflict, these information problems can be prevented by establishing bargaining protocols. These bargaining protocols specify, to varying degrees, negotiation procedures, thus reducing information problems and allowing the negotiators to avoid conflict. The more elaborate a bargaining protocol is, the more costly it will be. Hence, Reder and Neumann argue that the level of specification of the bargaining protocol will be balanced against the joint cost of conflict.[10] The higher the cost of conflict is, the more elaborate the level of specification (and, hence, the more costly) bargaining protocols will be. This argument yields the intuitively appealing prediction that conflict becomes more likely when the joint cost of conflict for both sides of the bargaining table decreases. Reder and Neuman find support for this prediction in an analysis of a panel of bargaining units in US manufacturing.

These two theoretical explanations for conflict, that information problems on the part of the negotiators and decreasing costs of conflict make conflict more likely, are integrated (cf. Card, 1990) in the asymmetric information bargaining models (Hayes, 1984; c.f. Fudenberg and Tirole, 1983; Cramton and Tracy, 2003). The core reasoning in these models is that conflict in collective bargaining is rational when there is asymmetric information (cf. Akerlof, 1970). Most commonly, the model assumes that employers know their ability to pay but that employees and the trade union negotiators representing them do not know the employer's ability to pay. Conflict is costly to both sides; hence, conflict can be used as a screening device. This is because employers would opt for conflict rather than giving in to demands only when the expected cost of conflict is smaller than the cost of giving in. Trade unions can thus use conflict to separate employers who are really unable to meet their demands from those who merely pose as being unable to meet their demands. The asymmetric information model, which is based on strictly rational actors in the presence of incomplete information, fits well with the game theoretic approach that has become common in economics and remains the central theoretical approach to labor conflict within this discipline (cf. Brunnschweiler, Jennings and MacKenzie, 2014). The implications that follow from the asymmetric information model have been extensively tested using a variety of bargaining unit-level data (e.g., Kennan and Wilson, 1989; McConnell, 1989; Card, 1990, Cramton, 1992).

10 i.e. the combined cost of conflict for both sides of the bargaining table.

A more recent development of the labor conflict literature within economics is the resurgence of what I will call the behavioral approach. General behavioral bargaining theories were developed decades ago (e.g., Walton and McKersie, 1969), but for a long time, their influence on economic bargaining theory was limited due to their deviations from strict rationality assumptions. In recent years, however, economic bargaining theory has increasingly recognized that negotiators' bargaining behavior may indeed structurally deviate from strictly rational, self-interested actor models and may sometimes be better explained by actor models[11] based on (social) psychological theory that assume cognitive biases and social preferences (cf. Rabin, 1993; Kahneman, 2003). This development has theoretical and methodological implications for studying conflict in bargaining. It implies that it can no longer be taken for granted that bargaining models that assume strictly rational negotiators and specify their strictly rational interaction will provide accurate predictions of observed bargaining outcomes at the bargaining unit level. This also means that it becomes vital to understand how negotiators will behave in reality under various conditions. Hence, although bargaining unit-level data have been seen as the appropriate micro level for testing traditional economic bargaining models, from the perspective of the behavioral approach, bargaining units actually represent aggregated data of individual negotiators and their interactions. Therefore, negotiator-level data, particularly questionnaire surveys and experimental analyses of bargaining behavior, are important for the behavioral approach.

Babcock and Loewenstein (1997) use bargaining experiments to study impasses in legal bargaining. Their theory is based on the assumption that negotiators are not simply rational maximizers but that they seek to obtain fair outcomes. What is judged to be fair, however, is subject to cognitive biases, in this case a self-serving bias. A self-serving bias entails that each negotiator tends to see outcomes as fair when the outcomes are favorable to herself or himself. This self-serving bias leads negotiators to develop incompatible views about what constitutes fair outcomes and creates conflict (see also Babcock, Loewenstein, Issacharoff and Camerer, 1995).

In summary, economists have predominantly sought to understand why conflict occurs between rational negotiators despite the obvious costs that are associated with it (Franzosi, 1989). Their main answer to this question is that conflict occurs because of inadequate information, but recent studies sometimes answer this question by proposing that negotiators are not perfectly rational because they have

11 Assuming asymmetric information is itself already a relaxation of strict rationally assumptions as it departs from perfectly rational *and* fully informed actors. With asymmetric information however, the actors themselves are still assumed to be perfectly rational, only the (informational) conditions for rational action are allowed to be sub-optimal. The behavioral economics approach however relaxes the rationality assumptions about actors themselves, in this case particularly by introducing social preferences and cognitive biases.

social preferences and cognitive biases. In either case, economists have worked under the assumption that conflict in collective bargaining is costly and therefore fundamentally irrational.

Sociology

The sociological literature on labor conflict is based on the Marxian assumption that there exists a pervasive discontent of employees due to their fundamentally antagonistic relationship with employers. This discontent will translate into manifest action whenever there is sufficient organization and resources available to the employees. Thus, whereas economists have been concerned with *why* conflict occurs, sociologists have seen conflict as inevitable and have been concerned with the question of *how* conflict can occur, that is, what conditions make conflict possible (Ibid, 1989). These differing approaches can be understood as the consequence of three related differences between the disciplines.

First, in contrast to mainstream economics theory, mainstream sociological theory does not conceive of conflict purely as something that imposes costs and that should therefore be rationally avoided. Rather, the short-term costs of conflict may be outweighed by the strategic, organizational and political gains (cf. Ross, 1948) from conflict in the long term. Thus, opting for conflict can be rational.

Second, economics is chiefly concerned with explaining labor conflict as it manifests in contemporary industrialized societies, where trade unions and employers meet as market actors within institutionalized bargaining contexts and conflicts are primarily related to workers' compensation for their labor (e.g., wages) (cf. Dunlop, 1944). Sociology, however, considers the political and socio-economic institutional context in which conflict takes place as changing and itself subject to contestation.

Third, whereas economists interpret conflict as a result of bargaining and consequently rely on bargaining theoretic approaches, sociology sees conflict as a collective action and hence is more concerned with theories that explain why individuals participate in it. In light of these differences, it makes sense that whereas economics has mostly shunned explanations of conflict purely as shifts in bargaining power, as proposed by Rees (1952; cf. Shalev, 1980: p. 137), such explanations are unproblematic from a sociological perspective. However, bargaining power in the sociological approach is not so much about economic factors such as employment as it is about labor's capacity to act collectively.

One of the earliest and most influential studies on labor conflict in this sociological tradition is Shorter and Tilly's (1974) analysis of mostly aggregated historical French strike data. Theoretically, these authors challenge explanations of conflict based on economic interest but conceive of conflict primarily as a type of collective action (cf. Olson, 1965) aimed at realizing political goals by pressuring employers and the government. This collective action will be successful if employees are sufficiently

organized, that is, when sufficient numbers of employees are members of a trade union and can be counted on to participate. Shorter and Tilly find substantial evidence that strike activity increases with trade union density (a finding that has since been repeated numerous times, e.g., Snyder, 1975; Skeels, 1982; Kaufman, 1982; Brandl and Traxler, 2010; Jansen, 2014) and that strike activity is related to national political change. In contrast with the labor conflict literature in economics, their findings also suggest that economic models are not able to account for variations in strike activity.

This apparent discrepancy is addressed by Snyder (1975), who undertakes a comparative time-series analysis of macro-level strike activity in France, Italy and the US. Snyder argues that the discrepancy arises because of differences in the institutional context. Economic bargaining theoretic approaches to labor conflict only apply when trade unions and collective bargaining are well established. Under these conditions, Snyder finds that conflict increases when the power of employees increases relative to the power of employers due to changing economic conditions, as previously argued by Rees (1952). However, when countries or historical periods preceding well-established trade unions and collective bargaining are analyzed, the logic of bargaining theory breaks down, and economic factors become less important than political factors in explaining variations in labor conflict.

Following a similar analytical strategy to analyze industrial conflict, Hibbs (1976) analyzes aggregate yearly variations in labor conflict in ten industrial countries in the post-war period, specifically, countries with established trade unions and collective bargaining. His analysis reiterates the importance of economically determined power as a predictor of conflict but also suggests that the political power of employees, indicated by the presence of socialist or labor parties in government, affects labor conflict. A similar argument is developed by Korpi and Shalev (1979), who argue that the political arena serves as a substitute for the employment relations arena as the locus for class conflict. With increasing organizational power, labor is assumed to gain more influence in national politics and to therefore be less likely to choose traditional expressions of labor conflict, such as strikes, to advance its interest. Korpi and Shalev offer strike data on several western countries, particularly Sweden, to support these claims.

A common feature of the sociological studies above is their emphasis on explaining the aggregate number of participants (e.g., strike volume) in labor conflict rather than the incidence of labor conflict. While the incidence of conflict received relatively more attention within economics, participation in conflict became the most important dependent variable in sociological studies of labor conflict. This focus on participation follows from the sociological conceptualization of labor conflict as principally a collective action problem. Subsequent studies of labor conflict within sociology have increasingly focused on explaining why individual employees choose to participate in industrial conflict events. Thus, both economics and sociology in the

1980s increasingly undertook micro-level analyses. However, while the relevant micro level within economics was thought to be the bargaining unit, in sociology it was the individual employee.

Klandermans (1984) uses longitudinal questionnaire data on trade union members in the Netherlands to test resource mobilization theoretical explanations of members' willingness to participate in collective industrial action. Theoretically, he frames this as a (rational) choice based on expectations about one's own contribution as well as the expected contribution of others and the success of the action. Successful mobilization by the trade unions thus depends on establishing conditions that lead sufficient numbers of members to arrive at the choice to participate. A particularly important aspect of this study is the finding that an individual's choice to participate in labor conflict is conditional on his or her expectations about other individuals' participation, which ties the study of labor conflict to 'structural embeddedness' approaches (cf. Granovetter, 1978; 1985). Following this approach, current studies of labor conflict within sociology (e.g., Dixon and Roscigno, 2003; Akkerman, Born and Torenvlied, 2014) are increasingly concerned with the role of social influence and social networks in explaining participation in labor conflict.

In summary, sociologists have treated labor conflict as inevitable and potentially rational in the long term. They have mainly addressed the question of when it will be more or less intense, that is, when more people or fewer people will be involved in conflict action. Their answer to this question was that the intensity of conflict depends primarily on the power of trade unions and employees to achieve favorable results. This power, in turn, varies with long-term political and socio-economic changes as well as the organizational capacity of labor. Social structure, particularly the actions of others, is seen as an important determinant of organizational capacity and hence of bargaining power. Thus, sociological research recognizes the importance of social influence and embeddedness, which are also at the heart of the notion of spillovers. However, because sociologists see labor conflict predominantly as a collective action problem of employees, they have paid sparse attention to explaining conflict in the context of well-institutionalized and pacified employment relations. Hence, sociological theory offers explanations that appear particularly informative for (often historical) contexts wherein labor conflict is a manifestation of long-term class struggles and the institutions guiding employment relations are restricted (Cohn and Eaton, 1989). It remains unclear, however, how and to what extent sociological theory can be applied to well-developed collective bargaining systems where conflict is often about wages and results from bargaining processes and the decisions of collective bargaining negotiators.

1.2.2 Spillovers and conflict: previous research

Studies on the impact of spillovers on *conflict* in collective bargaining are surprisingly scarce. Moreover, existing studies are poorly integrated and show limited progress. In the following section, I review the previous literature on spillovers and conflict. I distinguish between three theoretical viewpoints, which I refer to as 1) the mainstream economics approach; 2) the behavioral economics approach; and 3) the sociological approach.

Spillovers and conflict: the mainstream economics approach

Early examples of research related to spillovers and conflict in collective bargaining emerged when compulsory arbitration, an alternative dispute resolution process to strikes for negotiations that faced an impasse, was installed in some (public) sectors in the US. A common policy concern was that this procedure would induce a 'narcotic' effect because bargaining units that would resort to arbitration would more easily do so in subsequent bargaining events. Although no clear theoretical explanations were developed for such an effect, a series of studies (Wheeler, 1975; Kochan and Baderschneider, 1978; Butler and Ehrenberg, 1981; Chelius and Extejt, 1985) attempted to establish the impact of past disputes on the probability of current disputes. Initial findings supported the assumption that conflict would be addictive. However, the methodological challenges associated with correctly identifying these effects soon became apparent. This resulted in a move from simple bivariate analyses of surveys of bargaining units toward much more elaborate econometric models for panel data of bargaining units. These more sophisticated analyses suggested that there may actually be a 'negative narcotic effect' in which bargaining units that had disputes in the past become less likely to have disputes again (e.g., Butler and Ehrenberg, 1981). Although theoretically the explanations for such effects remained relatively obscure in these studies, their findings formed an important precursor to subsequent studies of vertical spillovers and conflict.

The first of these studies was by Mauro (1982), who developed a bargaining theoretic model starting from the Hicksian notion that costly conflicts must arise from incomplete information. Negotiators use external information to improve their information. Conflicts arise when union and firm negotiators base their bargaining positions on different external factors. The model implies that past experiences of conflict within a bargaining unit offer negotiators opportunities to *learn* about their mistakes. Hence, vertical spillovers occur when negotiators use information about past strikes in their bargaining unit to improve the congruence of the external factors upon which they base their bargaining position. This model thus offers a theoretical account of why strikes in the past decrease a bargaining unit's future strike probability. Mauro finds support for this hypothesis in panel data of a sample of US bargaining units observed over a 30-year period using fixed-effects logit models for the effect of

strikes in the previous negotiation on strike incidence in the current negotiation. This modeling approach, however, has some limitations[12] that cast doubt on the robustness of this finding. Consequently, Schnell and Gramm (1986) re-estimate this effect, which they label the 'teetotaler effect', with a number of first-difference linear probability models for strikes in a panel of US manufacturing bargaining units in the 1970s with (instrumented and non-instrumented) lagged dependent variables. They also find considerable evidence that negotiators *learn* to avoid strikes by using information obtained in past strike experiences. In contrast, Ingram, Metcalf and Wadsworth (1993) find no strong evidence in favor of any effect of past strikes on current strike incidence in their fixed-effects logit analysis of a panel of British manufacturing bargaining units in the 1980s. Further evidence for the teetotaler effect is found by Campolieti, Hebdon and Hyatt (2005) in a panel of Canadian bargaining units in the 1980s using fixed-effects logit and linear probability models for strike incidence.

The aforementioned literature on the effect of past strikes on current strikes assumes that rational negotiators learn from past conflict experiences when they have incomplete information. However, learning in this way is, according to Mauro's (1982) model, limited to negotiators realizing that their bargaining positions are based on dissimilar external factors. In contrast, Kuhn and Gu (1999, cf. 1998) argue that rational negotiators can learn directly from the information contained in spillovers. They consider the case of horizontal spillovers. Assuming that conflict results from asymmetric information about firms' ability to pay, they propose that the ability of different firms to pay can be similar, particularly when they operate in the same economic sector. If this is the case, trade unions can use information about the bargaining outcomes in other bargaining units to improve their information about the ability to pay of the firm with which they are bargaining (cf. Brugess, 1988; Hicks, 1932 p.138). Because this process of rational learning implies that horizontal spillovers reduce information asymmetries, the implication is that they reduce conflict. Kuhn and Gu find support for this implication by regressing the number of previous contract negotiations within a sector in the preceding months on the duration and incidence of strikes in bargaining units in that sector with fixed-effect linear and probit models for a panel of Canadian manufacturing bargaining units (1960s-1980s).

In summary, mainstream economic bargaining theory sees conflicts as a result of inadequate information. However, the environment can offer clues about those aspects of the bargaining event on which negotiators lack adequate information. Hence, information about the context of the bargaining unit, also known as 'external information', may be used by negotiators to improve their knowledge. Other bargaining events represent a source of such external information provided they are somehow

12 in particular, the incidental parameters problem

related to the uncertain aspects of the own current bargaining event, particularly employers' ability to pay. Because spillovers improve information and thus reduce the information problems that are the fundamental cause of conflict, the general implication of this approach is that spillovers tend to decrease conflict. At the same time, this implies that spillovers will only affect rational negotiators if these spillovers allow them to learn about aspects of the negotiation on which they have inadequate information.

Spillovers and conflict: the behavioral economics approach

Whereas the mainstream economics approach to spillovers sees negotiators as strictly rational maximizers, the behavioral economics approach sees negotiators as fundamentally concerned with achieving fair and equitable outcomes. The fairness of potential outcomes is assumed to always be judged relative to a reference point (Festinger, 1954; Adams, 1963; Frank, 1985; cf. Tversky and Kahneman, 1991). The outcomes of past negotiations or negotiations in other bargaining units provide possible reference points against which fairness is judged. If negotiators use these reference points, their preferences become reference-dependent. However, this leads to the question of when and why particular negotiations are either used or ignored as reference points. Such questions are difficult to answer with the observational data of bargaining units that are commonly used for testing mainstream economics theories of spillovers and conflict. These data only allow for econometric estimation of spillovers from a priori identified sources; that is, they necessitate exact prior knowledge about which reference points negotiators will take into account and how this will influence their bargaining behavior. Moreover, whereas mainstream economic bargaining theory yields clear predictions about observations at the bargaining unit level, the behavioral approach questions the validity of the rationality assumptions underlying such predictions. Thus, a shift from bargaining units toward individual negotiators as the primary unit of observation is needed. This shift is reflected in two methodological developments. First, studies of spillovers increasingly rely on experimental evidence to better understand how negotiators will be affected by information about other negotiations, that is, to test the actor-assumptions underlying theories of spillovers (cf. Charness and Kuhn, 2011). Second, negotiator surveys that specifically ask about the influence of other negotiations on bargaining behavior are gaining importance, such as surveys that measure negotiators' subjective evaluations of the relevance of potential reference points (see also McCarthy, O'Brien and Dowd, 1975; Blinder and Choi, 1990; Agell and Lundborg, 1995, 2003, Bewley, 1999).

The relevant experimental literature uses economic bargaining experiments based on highly simplified bargaining contexts, particularly the 'ultimatum game'. In its basic form, the ultimatum game consists of two persons bargaining over the

division of a sum of money, commonly referred to as 'the pie'. One person (the 'proposer') can propose a division; the other person (the 'responder') has to respond to this proposal by either accepting it or rejecting it. If accepted, each person receives the amount granted by the proposed division of the sum of money. If rejected, each person receives an alternative outcome, which is most commonly no money at all.[13]

A number of ultimatum game bargaining experiments have analyzed the impact of providing information about other negotiations. For instance, Knez and Camerer (1995) implement an ultimatum game with three players in which one proposer make offers to two responders simultaneously and each offer pertains to the division of a separate sum of money. Responders are informed about the outcome of the game for the other responder. Knez and Camerer find that responders reject offers more frequently when they are offered less than the other responder, even though the offers to the other responder do not affect their own payoffs. Disagreement ensues because proposers fail to anticipate this behavior of responders. These findings are directly relevant to understanding spillovers and conflict in collective bargaining because they show that principally separate bargaining events affect each other through information spillovers. In this case, the responders' preferences are affected by the outcomes achieved by other responders through 'social comparisons' (cf. Festinger, 1954) leading to conflicts in bargaining.

A similar finding is reached by Bohnet and Zeckhauser (2004), who analyze ultimatum games in which only the proposer knows the pie size (i.e., bargaining with asymmetric information). In their study, the players are informed about the average offers across all participants observed in previous rounds of the bargaining game. Bohnet and Zeckhauser find that by providing information on the average offer, responders become more likely to reject any given proposal. This indicates that social comparisons across negotiations increase conflict. However, in contrast to Knez and Camerer (1995), Bohnet and Zeckhauser (2004) find that proposers increase their offers in anticipation of the impact of social comparisons on the responders. A potential explanation for this discrepancy is that because the pie size is fixed in Bohnet and Zeckhauser's (2004) experiment, information about the average offers allows the responders to learn about the pie size. This would indicate that spillovers due to rational learning (c.f. Kuhn and Gu, 1999) and social comparisons occur simultaneously.

13 One of the most well known and robust findings from ultimatum game experiments is that people structurally deviate from strict rationality assumptions (see Thaler, 1988; Güth and Tietz, 1990; Camerer and Thaler, 1995; Güth and Kocher, 2013). Instead, they strongly favor equal-splits (i.e. a 50-50 division of the sum) and frequently do not propose or accept divisions that are too far from the equal-split, even when this means that they will earn less money than they could. These findings suggest that achieving fair outcomes is indeed often more important in bargaining than simply maximizing one's earning.

Tournadre and Villeval (2004) find evidence for both rational learning and social comparisons. They implement an ultimatum game in which only the responder knows how much money there is, but the players are informed about the outcome of a similar ultimatum game of one other pair of players. Aiming to directly test Kuhn and Gu's (1999) model of rational learning, Tournadre and Villeval (2004) explicitly incorporate a positive correlation between the amount of money in these ultimatum games and inform the players about this correlation. Their findings suggest that even though learning about the pie size by observing the outcomes of others leads to fewer rejections and hence less conflict, this pacifying effect of horizontal spillovers is offset by the simultaneous occurrence of social comparisons, which increase conflict.

A recent experimental study by McDondald et al. (2014) provides further clues to why social comparisons across negotiations lead to conflict. In their set-up, two players play the ultimatum game while a third person receives a fixed payment that is known to all three players. In line with previous experimental findings, social comparisons between the players and the third person increase conflict. However, McDonald et al.'s findings also indicate that whereas high payments to the third person lead the responders to raise their own minimum acceptable offer, low payments to the third person are ignored. This finding suggests that although negotiators can be affected by principally unrelated payments to others through social comparisons, this occurs only when such payments represent outcomes that are favorable to the negotiators themselves.

This selective impact of social comparisons is also found in actual collective bargaining by Babcock et al. (1996). They analyze survey responses and field data of teacher contract negotiators in school districts in Pennsylvania for 1983-1984 and 1988-1989. In their questionnaire, they ask the negotiators to evaluate the impact of bargaining outcomes in other districts on their bargaining behavior. Their study yields two major findings. First, negotiators' selection of relevant reference negotiations is subject to self-serving bias (cf. Frank, 1985; Babcock et al. 1995; Babcock and Loewenstein, 1997; Babcock et al. 2005), with employee representatives choosing high-wage outcomes as references while employers choose low-wage outcomes as references (see also Rees, 1993 for anecdotal evidence of this phenomenon in wage bargaining). Second, analyzing strike propensity in the negotiators' bargaining units with a tobit model, Babcock et al. find that the larger the discrepancy in the reference wages between the negotiators on either side of the bargaining table is, the larger the probability of a strike in that bargaining unit becomes. Thus, because negotiators exhibit a self-serving bias in their evaluation of information about the outcomes in other negotiations, horizontal spillovers due to social comparisons increase the divergence between them, leading to increasing conflict.

Although it is principally concerned with the wage-setting process in general rather than explaining conflict specifically, another highly informative study is Bewley's (1999) survey analysis of 374 businesspeople and trade unions involved in wage bargaining in the US in the early 1990s. Two of his findings are especially relevant for our understanding of spillovers and conflict in collective bargaining. First, employees and the trade union negotiators that represent them strongly judge the fairness of wage offers against their own past wages. Wage offers are only deemed to be fair if they exceed, or at least are not below, previous wages (cf. Blinder and Choi, 1990; Agell and Lundborg, 1995, 2003). If this expectation is violated, conflict ensues. Second, employers who seek to restrain wages because of economic set-backs can avoid conflict if they have a reputation for being fair. Both of these findings indicate how vertical spillovers can affect conflict in collective bargaining. In the first case, information about past bargaining outcomes within the bargaining unit in the form of wages creates reference points against which employees evaluate the fairness of new potential bargaining outcomes, thus creating expectation effects that lead to conflicts. In the second case, information about the behavior of the employer in past negotiations creates reputation effects that can make employees more willing to accept offers that they would not accept in the absence of such a reputation, that is, offers which would otherwise lead to conflict.

In summary, behavioral bargaining theoretic approaches to spillovers and conflict are based on (social) psychological theories of behavior. Negotiators are seen as fundamentally concerned with achieving fair outcomes. Fairness is always judged in relation to some reference point. Because the outcomes in other negotiations provide such reference points, information about them will influence the preferences of negotiators. Hence, spillovers, from this perspective, occur because negotiators and/or the people who they represent have reference-dependent preferences. By and large, spillovers that arise due to reference-dependent preferences increase conflict in collective bargaining because such spillovers increase the divergence between the negotiators.

Spillovers and conflict: the sociological approach

Sociological research takes a different perspective on spillovers. Central notions in this perspective are that actors are fundamentally embedded in social networks (Granovetter, 1973; 1985), that it is rational for actors to base their actions on the observed actions of others (Hedstrom, 1998) and that this can lead to the diffusion of behaviors among actors (cf. Colemean et al. 1957; Burt, 1987; Strang and Tuma, 1993). Coupled with the sociological concept of labor conflict as pervasive and potentially rational in the long term, this has led to the application of diffusion theory to labor conflict.

The notion that societal conflict follows patterns of diffusion was first applied to labor conflict, specifically to strikes, by Connel and Cohn (1995). They argue that strikes lead to further strikes because they transmit information across workplaces. Workers are fundamentally uncertain about the cost and benefits of conflict. By observing strikes elsewhere, however, workers may rationally decide to strike because they learn about grievances, opportunities and the favorability of power relations. Connel and Cohn test this imitation model of strikes with an event-history analysis of strike incidence in Third Republic French coal mining departments and find strong evidence of the temporal clustering of strikes. Strikes, even unsuccessful ones, appear to lead to further strikes. This clustering, however, becomes less apparent with rising levels of unionization and increasingly institutionalized and pacified labor relations.

The applicability of diffusion models to labor conflict for historical contexts is underlined by a series of studies by Biggs. Using statistics and qualitative evidence from the American Strike Wave of 1886, Biggs argues that successful strikes lead to further strikes (2002). This notion is further developed in his second analysis of these events (2003), in which he introduces two causal mechanisms, inspiration and interdependence, as explanations for the diffusion of strikes. Inspiration implies that workers are fundamentally uncertain about the cost and benefits of striking but can reduce this uncertainty when they have information about others who are striking (cf. Connel and Cohn, 1995). Interdependence implies that workers will become more likely to participate in strikes when they know others are striking because the chance of success rises with an increasing number of strikers (cf. Klandermans, 1984), whereas retaliation becomes less likely. Using time-series analysis and qualitative evidence, Biggs finds that the (aggregate) number of strikers in a strike wave is positively affected by their lagged observations; that is, the larger the number of strikers is, the larger it will become subsequently. In a analysis of late nineteenth-century strike waves in Chicago and Paris, Biggs (2005) finds that the aggregate observations of this variable follows power laws similar to those that describe the outbreak of forest fires. This finding further supports the notion that labor conflict follows patterns of diffusion.

To conclude, the sociological perspective suggests that latent conflict is pervasive, but the potential outcomes of actual conflict are uncertain. Manifest conflicts will erupt whenever workers and/or trade unions believe that they have sufficient bargaining power, particularly organizational resources, to realize their goals. Bargaining power is inherently uncertain ex ante. However, information about conflict in other negotiations, such as their success in mobilizing workers and achieving favorable results, can help reduce this uncertainty if the bargaining power is similar. Thus, as in the mainstream economic approach, information about other negotiations can be used to rationally learn about an unobservable part of

the bargaining relationship. However, this aspect is not the firm's ability to pay but organizationally determined bargaining power.

Spillovers and conflict: one problem, three solutions?

As discussed above, questions about how spillovers influence conflict in collective bargaining have receive quite different and seemingly contradictory answers depending on the theoretical viewpoint adopted. The two economic bargaining theoretic accounts share a view of conflict as the result of a bargaining process, and they are both based on the assumption that conflicts are fundamentally irrational in that they create costs for either side of the bargaining table. An integrated understanding of the influence of spillovers on conflict in collectives requires systematic testing of the validity of the divergent actor-assumptions on which the two approaches are based and the spillover mechanism that they imply. Research is currently moving in this direction, particularly through the analysis of bargaining experiments, but an integrated framework is still lacking. Such a framework ideally should not reduce explanations of the impact of spillovers on conflict to mechanisms taken from either approach but rather should clarify the conditions under which the mechanism proposed in both approaches will operate.

Nevertheless, even with the integration of the mainstream and behavioral bargaining theoretic accounts, current economic bargaining theory has a blind spot regarding the existence of spillover mechanisms based on the diffusion of information related to organizationally determined bargaining power. Such mechanisms are recognized in the sociological approach to spillovers. However, this sociological account is based on the assumption that conflict can be rational, an assumption that economic bargaining theoretic approaches have mostly dismissed. To integrate the economics and sociological approaches, it is necessary to assume at the outset that conflict is costly to either side and is irrational in some cases but also that the benefits of conflict can, under some conditions, outweigh its cost and make conflict rational. These different assumptions about the nature of the action problem associated with a choice for or against conflict make integrated experimental tests a difficult proposition, as does the difficulty of incorporating organizational bargaining power in bargaining experiments. Survey analyses offer a better way of simultaneously testing all three approaches to spillovers and conflict in collective bargaining.

The sociological literature thus far has largely avoided investigating whether and how the mechanisms for spillovers that it invokes operate in contemporary labor relations systems, particularly in collective bargaining. It is therefore necessary to further develop the theoretical account of spillovers and conflict in this literature in order for it to be applicable to such contemporary contexts.

1.3 Methodological challenges

Before I turn to the contribution I aim to make with this thesis of examining how spillovers influence conflict in collective bargaining, I will first briefly review the major methodological challenges associated with this aim in previous research.

Analyzing spillovers is complicated by a number of difficulties. First, because the pool of bargaining events that may potentially influence negotiators is virtually infinite, it is impossible to empirically analyze all potential spillovers. Hence, a priori limitations must be made on potential sources of spillovers. However, well-tested theories that detail how negotiators select which other negotiations to take into account and which to ignore are currently lacking. Researchers have thus either somewhat haphazardly selected other negotiations in their analyses or have chosen to analyze those that best fit their hypotheses. In both cases, findings may be severely misleading due to a biased selection of independent variables.

Second, specific spillovers resulting from different mechanisms can have different and potentially counteracting effects. The common practice of analyzing the impact of aggregated observations of potentially influential negotiations may therefore 'average out' the true effects of specific spillovers. Analyses of aggregated data suffer doubly from this phenomenon because both independent and dependent variables can potentially be distorted by counteracting spillovers.

Third, in the case of horizontal spillovers, it is often difficult to separate true spillover effects from observed patterns of communality between bargaining units that actually result from similar contextual conditions. This problem is already well understood in wage spillover studies, where similar wages can result from spillovers but can also result from the bargaining units' response to similar economic conditions. Despite promising advances in econometric modeling, analyses of spillovers with currently available observational data-sets are still severely hampered by this problem.

Fourth, a similar problem arises when one tries to identify vertical spillovers because the observed influences of past negotiations on present negotiations within a bargaining unit can also result from potentially unobserved characteristics of that bargaining unit that influence each negotiation (cf. Heckman 1991).

Fifth, studies of labor conflict have predominantly focused on conflicts that are readily observable in the available observational data, particularly strikes. In addition to well-known problems with existing strike data (Franzosi, 1989), this is problematic because conflict in collective bargaining does not necessarily take the form of strikes, which are commonly restricted by institutions and law. However, the absence of strikes does not imply the absence of conflict. It is thus necessary to also consider the impact of spillovers on more subtle manifestations of conflict in collective bargaining, both as a source of spillovers and as a potential outcome.

1.4 The contribution of this study

In this study, I aim to contribute to our understanding of the impact of spillovers on conflict in collective bargaining. I aim to further develop and integrate the currently isolated approaches to spillovers and conflict in the disciplines of economics and sociology. In this way, I work toward a coherent understanding of the impact of spillovers on conflict that takes advantage of the insights of current economic bargaining theory, both the mainstream and the behavioral types, and of sociological diffusion theory.

Furthermore, I test the causal mechanisms that are implied in the various approaches by collecting two types of primary data. First, I undertake bargaining experiments that allow me to critically evaluate the different actor assumptions in economic bargaining theory and their implications for the influence of spillovers on conflict under various conditions. The experimental designs allow me to isolate specific spillover effects. Second, I collect questionnaire survey data on a representative sample of union and firm negotiators in the Netherlands. These data, the *Dutch Negotiator Survey 2011,* record negotiators' self-reported influence of various types of information on their bargaining behavior, allowing me to directly measure such influences. Moreover, the data record whether the negotiators experienced conflict in the collective bargaining events, both in the form of strikes and in the form of bargaining impasses.

1.5 Research questions

1.5.1 Central research question

As I have shown in section 1.2, different disciplines have developed various theoretical mechanisms that may explain how spillovers affect conflict in collective bargaining. However, it remains unclear how and under what conditions spillovers lead to more or less conflict in collective bargaining due to a lack of integration and methodological difficulties in identifying spillovers. In this book, I will develop, integrate and test the different approaches using data and methods that allow for better identification of spillovers. In this way, I will address the following central research question:

How and under what conditions do spillovers affect conflict in collective bargaining, and to what extent can different theoretical mechanisms account for this?

To address this question, I will investigate a number of interrelated specific sub-questions. I begin from the various extant bargaining theoretic approaches and the assumptions on which they are based, which I address in the first two sub-questions using bargaining experiments. Then, I integrate the bargaining theoretic and the

sociological approach and investigate these approaches using survey data on negotiators involved in collective bargaining.

1.5.2 Experimental analyses of spillovers and conflict in wage bargaining

In the first two empirical chapters of this book, I present experimental studies on the impact of spillovers on conflict in bargaining. These studies aim to test the different behavioral assumptions in current bargaining theoretic approaches to the impact of spillovers on conflict. A major advantage of the experimental method is that it allows me to identify and fully control the spillovers that can occur in bargaining. The studies begin from a simple bargaining model and progressively add different types of spillovers to the analysis. In these two chapters, I focus on spillovers that consist of information about bargaining outcomes in other negotiations, in line with (economic) bargaining theoretic approaches.

Chapter 2: Research question on mechanisms causing horizontal spillovers and their impact on conflict in bargaining

In this chapter, the impact of horizontal spillovers on conflict in bargaining is studied with the aid of a bargaining experiment. This study contrasts the mainstream economics approach to spillovers with the (social) psychologically informed behavioral economics approach. Economic bargaining theory offers two theoretical mechanisms for horizontal spillovers based on these two approaches, 'rational learning' and 'social comparisons'. The rational learning mechanism leads to the prediction that horizontal spillovers decrease conflict in bargaining, whereas the social comparison mechanism predicts that they increase conflict in bargaining. Hence, in Chapter 2, the following research question is addressed:

RQ1: *How do horizontal spillovers resulting from rational learning and social comparisons influence conflict in wage bargaining?*

An asymmetric information two-person[14] unstructured bargaining game with economic incentives is implemented in the experiment. This design is focused on the distributive aspect of collective bargaining, that is, wage bargaining.[15] Horizontal spillovers are incorporated into the experimental design by providing the participants with information about the bargaining outcomes of other participants. The experiment compares bargaining with horizontal spillovers that result from social comparisons to bargaining with horizontal spillovers that allow for rational learning. Bargaining without spillovers is used as a control condition.

Chapter 3: Specific research question on mechanisms causing vertical spillovers and their impact on conflict in bargaining

Chapter 2 offers a first joint experimental test of the impact of two separate mechanisms for horizontal spillovers on conflict in wage bargaining. However, it does not consider that spillovers emanate not only from other bargaining units (horizontal spillovers) but also from the past of the bargaining unit itself (vertical spillovers). Chapter 3 develops an integrated theoretical framework based on economic bargaining theory within which to study the impact of horizontal and vertical spillovers on conflict in wage bargaining. Two mechanisms for vertical spillovers are introduced, 'reputation effects' and 'expectations effects'. As with the two mechanisms for horizontal spillovers discussed in Chapter 2, these two mechanisms for vertical spillovers lead to divergent predictions about the impact of spillovers on conflict in bargaining. The reputation effects mechanism suggests that vertical spillovers can decrease conflict, whereas the expectation effects mechanism suggests that vertical spillovers increase conflict in bargaining. Chapter 3 therefore addresses the following question:

RQ2: *How do vertical spillovers resulting from reputation effects and expectation effects influence conflict in wage bargaining?*

14 I focus on bargaining in its most simple form, i.e. involving only two actors: one union negotiator representing the interest of the employees and one firm negotiator representing the interest of the employer(s).

15 Collective agreements define the terms and conditions of employment in general, of which wages are a part. With wage bargaining, I focus on the aspect of collective bargaining where there is an obvious conflict of interest and bargaining is fundamentally distributive (c.f. Walton and McKersie, 1965). I use the expression 'wage bargaining' for this because it commonly known and signals that I am here dealing with this distributive aspect of collective bargaining. It should however be noted that many, perhaps most, issues in collective bargaining imply monetary costs or benefits to either side of the bargaining table and are treated as such in practice. Hence, the findings of my studies will have validity for many issues in collective bargaining besides wages.

To address this question, the impact of vertical spillovers on conflict in bargaining is experimentally tested. This analysis supplements the experimental design and data on horizontal spillovers presented in Chapter 2 with new experimental treatments. The experimental design models vertical spillovers by providing the participants with information about the firm negotiators' fairness in previous negations, allowing them to build reputations and analyzing past bargaining outcomes of the union negotiators that can induce expectations.

1.5.3 Analyses of spillovers and conflict in collective bargaining using negotiator survey data

The next two empirical chapters focus on the impact of spillovers on negotiators' bargaining behavior, and subsequently on conflict, using observations from actual collective bargaining. Whereas Chapter 2 and Chapter 3 analyzed the assumptions of different (economic) bargaining theoretic approaches, this section of the book integrates these assumptions with the sociological approach to labor conflict. Thus, I will expand the notion of spillovers as purely related to bargaining outcomes to include spillovers that are related to strategic information about conflict, which have thus far been largely ignored in the (economic) bargaining theoretic approach but are crucially important from the perspective of the sociological approach. The different approaches are evaluated through analyses of the *Dutch Negotiator Survey 2011*.

Chapter 4: Specific research questions on the influence of external information on negotiators

The experimental analyses presented in Chapter 2 and Chapter 3 allow for full control over what information is available to the negotiators that are analyzed. Although this a major methodological advantage because it offers the possibility to isolate specific spillover effects, in actual collective bargaining situations, many different types of information may affect negotiators' bargaining behavior. It is therefore necessary to understand how various types of information influence bargaining behavior and how differences in this influence can be explained. These issues are addressed in Chapter 4. The analysis of spillovers in this chapter is embedded within the larger question of how information that is not part of the negotiation process but is external to it affects bargaining behavior. In this way, the importance of spillovers relative to other influences of external factors can be evaluated. The study broadly distinguishes four types of external information: spillovers, information about the economic context, information about organizational power, and information about the institutional context. Each of these general types is subdivided into a number of relevant specific types of external information. Particular attention is paid to different types of spillovers. These may differ according to their source (i.e., according to the bargaining events to which they relate) or according to their informational content (i.e., according to what

information they transmit). Informational content may refer to bargaining outcomes as well as conflict in other negotiations. The chapter first addresses a descriptive question about the impact of these different types of external information on the bargaining behavior of negotiators.

RQ3a: *To what extent are negotiators in collective bargaining influenced by different types of external information?*

Second, it is important to understand when any type of external information has more or less influence on negotiators' bargaining behavior. Influence may depend on the characteristics of negotiators, such as whether they are union or firm negotiators. It may also depend on the characteristics of the bargaining unit, such as whether it is a single firm or a whole sector. Finally, in the case of spillovers, influence may depend on their source, such as whether it is the past of the bargaining unit (i.e., vertical spillovers) or other bargaining units (e.g., horizontal spillovers). Therefore, theoretical explanations for variations in the influence of the different types of external information are developed and tested to answer a second research question:

RQ3b: *To what extent can differences in the influence of external information between negotiators be explained by the characteristics of the negotiators, bargaining units and the type of information?*

Both of these questions are addressed with a statistical analysis of the *Dutch Negotiator Survey 2011*.

Chapter 5: Specific research questions on the influence of spillovers on conflict in collective bargaining
Whereas Chapter 4 addresses the impact of spillovers on collective agreement negotiators' bargaining behavior, Chapter 5 examines the resulting impact of spillovers on conflict. It develops and tests hypotheses about this impact based on the previously discussed and analyzed economic bargaining theories and on an application of sociological diffusion theory. In this chapter, I show that these different approaches lead to different predictions about the impact of spillovers on conflict in collective bargaining and critically evaluate each of these predictions against empirical reality. The analysis presented in this chapter differentiates spillovers from various sources and with different informational content and differentiates their influence on various types of negotiators. In this way, it addresses the following research question:

RQ4: *How and under what conditions does information about other bargaining events influence the probability of negotiators experiencing conflicts in collective bargaining?*

To answer this question, further statistical analysis will be conducted on the survey data collected in 2011 on Dutch union and firm negotiators.

1.6 Overview

The remainder of this book can be divided into three main sections. The first section includes Chapter 2 and Chapter 3, in which I examine the behavioral foundations of bargaining theoretic explanations for spillovers. These chapters report on experimental analyses of research questions RQ1 and RQ2. The second section of this book consists of Chapter 4 and Chapter 5. Here, I present analyses of the impact of spillovers on negotiators' bargaining behavior and subsequently on conflict in collective bargaining in The Netherlands. In these chapters, I address research questions RQ3a, RQ3b and RQ4. These two main sections are followed by Chapter 6, in which I present the conclusions of the study and discuss the findings.

2

Horizontal spillovers and conflict in wage bargaining: experimental evidence[16]

16 A slightly different version of this chapter has been submitted for publication in *Journal of Behavioral and Experimental Economics* (current status: revise and resubmit). An earlier version of this chapter was presented at the Tinbergen workshop on Economic Theory and Game Theory in Amsterdam, the Netherlands, April 2013; at the European Sociological Association Conference in Turin, Italy, August 2013; and at the HRM Research Seminar University of York, York, United Kingdom, February 2014. Co-authors are Jana Vyrastekova, Agnes Akkerman and René Torenvlied.

Abstract

We investigate how information spillovers from other negotiations affect conflict in bargaining. Two theoretical mechanisms are studied: 1) social comparisons, which are hypothesized to increase conflict due to self-serving biases, and 2) rational learning, which is hypothesized to decrease conflict by reducing information asymmetries. Our experimental design allows for an interactive bargaining process and offers full control over the information available to negotiators. Consistent with studies of one-shot games, we find that spillovers resulting from social comparisons increase conflict; however, the bargaining process mitigates this effect. In bargaining situations in which spillovers also allow for rational learning, the conflict-increasing effects of spillovers are prevented.

2.1 Introduction

Conflicts that arise during wage bargaining in firms are influenced by information about negotiations in other firms (Babcock et al. 1996; Babcock et al. 2005; Kuhn and Gu, 1999). We refer to this influence as 'horizontal spillovers'. The economics literature proposes two mechanisms that explain these spillovers: *social comparisons,* which stem from fairness and equity considerations (Babcock et al., 1996; Babcock et al., 2005), and *rational learning,* which results from the revelation of private information about the firm's ability to pay (Kuhn and Gu, 1998, 1999). Social comparisons are thought to increase the level of conflict in wage bargaining, whereas rational learning is thought to reduce the level of conflict.

Experimental research offers valuable insights into spillovers in bargaining (cf. Falk and Fehr, 2003; Charness and Kuhn, 2011) because it allows the researcher to manipulate the availability of information to bargaining parties to isolate spillover effects.[17] Existing experimental studies predominantly model wage bargaining as a 'take-it-or-leave-it' (ultimatum) game. Such a representation does not allow negotiators to actively coordinate and, consequently, may overstate the influence of spillovers. To overcome this shortcoming, we implement an experimental design that allows two subjects (a trade union negotiator and a firm negotiator) to exchange proposals, a representation that more closely mimics real-world wage bargaining contexts. With this experimental analysis, we address the following research question: *how do horizontal spillovers resulting from rational learning and social comparisons influence conflict in wage bargaining?*

Our experimental design contrasts a control condition (bargaining without spillovers) with two treatment conditions allowing for spillovers. One treatment condition provides information about the outcomes of other negotiations but does not reveal the other firm's ability to pay (stimulating subjects to make social comparisons). The second treatment condition provides information about the outcomes of other negotiations and reveals that the other firm's ability to pay is identical (allowing subjects to learn rationally). We study the impact of spillovers on conflict in an interactive bargaining process by analyzing (1) trade union negotiators' initial demands, (2) the level of divergence between trade union negotiators' and firm negotiators' proposals during the bargaining process, and (3) the likelihood of reaching no agreement.

17 In natural data the isolation of 'true' influences is often problematic, due to spurious correlations and the measurement of appropriate reference points (Mitchell, 1982; Manski, 1993).

2.2 Theory and hypotheses

2.2.1 Theory

The two theoretical mechanisms that explain spillovers in wage bargaining, social comparisons (cf. Festinger, 1954) and rational learning (Kuhn and Gu, 1999; Burgess, 1988), both predict that demands are affected by information about the (observed) outcomes of other negotiations. However, the two mechanisms produce competing predictions about the level of conflict resulting from spillovers.

The core assumption in the social comparisons mechanism is that labor relations are affected by concerns about fairness and equity (cf. Adams, 1963; Frank, 1984; Akerlof and Yellen, 1990; Rees, 1993). Specifically, it assumes that the preferences of negotiators (and the individuals they represent) are influenced by the incomes and relative standings of others (e.g., Babcock et al., 2005). Consequently, the outcomes of other negotiations may become reference points for demands. Given that many other negotiations take place and all produce outcomes, a key question is which of these outcomes will be used as a reference point (cf. Clark and Senik, 2010). Studies show that the choice of a particular reference point is often subject to self-serving biases (Babcock et al. 1995, 1996; cf. Rees, 1993). Hence, trade unions formulate their wage demands on the basis of relatively high wages negotiated elsewhere, whereas firms formulate their wage offers on the basis of relatively low wages negotiated elsewhere. Consequently, spillovers that arise from social comparisons will increase the level of conflict between union negotiators and firm negotiators, as reflected in their proposals.

Kuhn and Gu (1998, 1999) propose rational learning as an alternative explanatory mechanism for spillovers in wage bargaining. This mechanism is based on the assumption that the firm has private information about its ability to pay wages. Costly conflicts, such as strikes, serve as devices to reveal a firm's true ability to pay (e.g., Hayes, 1984; Kennan and Wilson, 1989; McConnell, 1989; Card, 1990; cf. Cramton and Tracy, 2003). Kuhn and Gu (1999) further assume that the ability to pay is correlated between specific firms, for instance, when they operate in the same sector and are subject to similar product market conditions and technological shocks. Kuhn and Gu (1999) develop a two-state bargaining model in which firms know their state (either 'good' or 'bad') and unions know the state of a firm only with some probability. Based on this probability, a union will make either a high or a low wage demand, which a firm can either accept or reject. Low wage demands will never result in a loss for the firm. High wage demands will leave firms in a 'bad' state with a loss exceeding the costs of a strike, whereas firms in a 'good' state are better off accepting the high demand. Hence, a firm negotiator will always accept a low demand and will accept a high demand only when the firm is in a 'good' state.

Kuhn and Gu (1999) show that union negotiators are able to learn by observing other negotiations. On the basis of these observations, union negotiators update their prior belief that their own (similar) firm is in a 'good' state and adjust their demands accordingly. A crucial but implicit assumption of the model of Kuhn and Gu (1999: 122) is that union negotiators are strictly rational in their evaluation of reference points, meaning that they only take into account other wage bargaining events that reduce uncertainties about the state of the firm. Spillovers resulting from rational learning thus reduce the information asymmetries that cause conflicts in wage bargaining to arise. Hence, contrary to the prediction of the social comparison mechanism, the rational leaning mechanism predicts that spillovers reduce the level of conflict in wage bargaining.

2.2.2 Evidence

Empirical evidence on the basis of natural data provides mixed evidence. A study of social comparisons in wage bargaining by Babckock et al. (1996) reports increasing strike probabilities with increasing distance between negotiators' reference points, providing support for the social comparison mechanisms. By contrast, Kuhn and Gu (1999) report decreasing strike probabilities with an increasing number of observable negotiations in an industry, providing support for the rational learning mechanism.

Experimental studies provide support for the social comparisons mechanism; it is sufficient to induce spillovers (Knez and Camerer, 1995; Alewell and Nicklisch, 2009) and, in conjunction with self-serving biases, increases the level of conflict (cf. McDonald et al. 2013). Experimental studies provide less conclusive evidence about rational learning. An experimental test of Kuhn and Gu's (1999) bargaining model by Tounadre and Villeval (2004) finds limited evidence for the predicted conflict-decreasing effects of rational learning.[18] It appears that the mechanism of social comparisons offsets the effects of rational learning. Bohnet and Zeckhauser (2004) experimentally study the effects of information about the average offer in repeated ultimatum bargaining with asymmetric information and a fixed pie size. Their study suggests that social comparisons increase conflict and that social comparisons are reinforced when rational learning is possible. To our knowledge, no experimental study isolates the impact of rational learning on bargaining from social comparisons.[19]

18 Evidence for conflict decreasing learning is found only with the introduction of additional information about the first unions beliefs about the size of the pie. Unions were otherwise unable to distinguish between outcomes in other negotiations that signal that the firm is in a bad state and outcomes resulting from a violation of social preferences.

19 It is relatively straightforward to isolate social comparisons from rational learning by studying the impact of information about outcomes of other negotiations that do not have correlated private information. However, if private information is known to be correlated, i.e. if learning is possible, it cannot be ruled out that information about other negotiation outcomes also triggers social comparisons. The impact of learning must therefore be inferred from observed difference between situations that only allow for social comparisons and situations that allow for both mechanisms to operate. Note however that this corresponds to real world bargaining situations where every potential reference point could induce spillover via social comparisons.

2.2.3 The model

We model wage bargaining as a two-player unstructured bargaining game in which the firm player has private information about the value of a common surplus that is to be divided. The union player knows only a set of possible values of the common surplus. In this way, we capture the asymmetric information between the union and firm negotiator about the firm's ability to pay. The value of the common surplus for each negotiation is drawn randomly from a set of possible values, reflecting that the firm's ability to pay varies with economic circumstances. The union player is the first mover; (s)he makes an initial proposal that starts a time-limited bargaining process. This is analogous to the common practice of starting negotiations with union wage demands. During the bargaining process, each player can make an unlimited number of proposals or accept the other player's most recent proposal. Proposals are discrete, positive numbers with a maximum value restricted to the highest possible value of the common surplus, representing the union player's pay-off if accepted (i.e., the potential wage rate). The firm player's pay-off is determined by subtracting the accepted proposal from the value of the common surplus. Proposals that exceed the value of the common surplus and hence leave the firm player with a loss are possible.

If no proposal is accepted, both players receive a non-agreement payoff, which is zero points. This fall-back position is common knowledge. The non-agreement payoff may be interpreted as the cost of not reaching an agreement. In real wage bargaining, this cost would arise from strikes, lock-outs or termination of the bargaining unit. The time-limited bargaining structure reflects that wage bargaining is an interdependent concession process wherein the unions and firms attempt to find a mutually acceptable agreement. However, bargaining cannot continue endlessly, and the longer it takes for the negotiators to make a sufficient concession, the greater the probability of suffering the cost of not reaching an agreement (cf. Roth et al. 1988: 820). The model does not allow for either player to withdraw from bargaining before the deadline. This assumption is grounded in common practice; spontaneous strikes or lockouts rarely occur in most contemporary wage bargaining contexts and are often prohibited by labor law.

2.2.4 Experimental design

In our experiment, the value of the common surplus to be divided is 24 points plus a variable number of additional points, which takes any of the following possible values: {-12, -10, -8, -6, -4, -2, 0, 2, 4, 6, 8, 10, 12} with an equal probability. Nature draws a number from the set of additional points, and only the firm player is informed about this value. The union player knows only that the common surplus is 24 points plus one of the possible number of additional points.

Bargaining takes place by making proposals representing the number of points earned by the union player if accepted. The proposals can be any whole number between 0 points and the maximally possible common surplus of 24 + 12 = 36

points. Bargaining starts with the (uninformed) union player making an opening proposal. Once this opening proposal is made, both players can make any number of proposals or accept the other player's most recent proposal. The history of previous proposals is visible to both players throughout the negotiation. Bargaining time is limited to 60 seconds. If a proposal is accepted, the negotiation is finished. The union player receives the number of points that the specific proposal represents. The firm player earns 24 points plus the additional number of points minus the points reflected by the proposal (i.e., the residual common surplus). If no proposal is accepted within 60 seconds, each player receives the non-agreement payoff of zero points. After the bargaining game, the payoff screen informs both players about their own payoffs. Participants play this bargaining game for 15 periods.[20] In each period, each participant is randomly matched to another participant in the session.

In the CONTROL condition, the bargaining game is played as described above. Thus, the union players know the possible values of the additional points and the probability that they are realized, and the firm players know the actual value of the additional points. No additional information is provided.

The two treatment conditions differ from the CONTROL condition in that they provide additional information in the form of a 'reference outcome' to the players. The reference outcome is an actually observed bargaining outcome of one other bargaining pair in the CONTROL treatment. The reference outcome either reports the number of points of the accepted proposal or, in the case of non-agreement, reports that no agreement was reached.[21] The reference outcome is updated in each period. We truthfully inform the participants that the reference outcome is obtained from other participants who were subject to the same bargaining protocol.

The two treatment conditions differ in one important respect. In the UNCORRELATED treatment, the reference outcome is taken from a negotiation in which the variable number of additional points can take any of the possible values with equal probability. In the CORRELATED treatment condition, the reference outcome is taken from a negotiation where the additional number of points is identical to that in the subject's own negotiation. The subjects are informed which situation applies via a statement that appears on the bargaining screen just above the reference outcome. In the UNCORRELATED treatment, the statement reads, *'The number of additional points in this other pair was one of the numbers {-12,-10,-8,-6,-4,-2,0,2,4,6,8,10,12}, all equally likely.'* In the CORRELATED treatment, the statement reads, '*The number of additional points in this other pair was EXACTLY THE SAME as it is now in your pair.'*

20 To enable a comparison of datasets across treatments, we drew a one set of 15 variable surplus values before the first experimental session and used the same set of values in all sessions.

21 Reference outcomes that are non-agreements are included in order to provide a truthful and realistic presentation of the other players negotiating outcomes. We do not test specific hypotheses about the non-agreements but will control our analyses for their presence.

Thus, the CONTROL condition differs from the treatments only in that there is no reference outcome presented to the players. All other information is identical. This condition therefore provides a baseline of the bargaining game with no spillovers. The UNCORRELATED treatment condition provides reference outcomes but informs the players that the variable number of points and hence the common surplus that the other pair divided could take any of the possible values with equal probability; that is, it is uncorrelated with the common surplus of the players. The CORRELATED treatment condition provides reference outcomes and informs the players that the value of the common surplus that the other pair divided is identical (i.e., perfectly correlated) to the common surplus of the players.

2.2.5 Hypotheses

The bargaining process

Regardless of the experimental condition, we expect that any bargaining process will be characterized by proposals that—in terms of their pay off to the players—will initially exceed the players' expected outcome and are revised downward over time, reflecting the union and firm players' concession curves (cf. Hicks, 1932). Thus, union players will start by making relatively high proposals, and firm players will start by making relatively low proposals. Players' proposals are subsequently expected to converge during the bargaining process.

Rational players would aim for proposals that maximize their pay-off but are feasible to reach agreement, avoiding the pay-off of zero points. The union player does not know the value of the common surplus, but (s)he is aware that the firm player does. While anticipating that proposals that exceed the common surplus will not be accepted by the firm, union players will use the bargaining process to assess the highest acceptable proposal given the value of the common surplus. The firm player, in contrast, will use the bargaining process to convince the union player to make or accept the smallest possible proposal.

However, we know that observed bargaining behavior does not conform to the predictions based exclusively on the assumptions of rationality. Rather, there is a clear tendency toward an equal division of the common surplus (cf. Güth and Tietz, 1990; Camerer and Thaler, 1995). If that tendency holds, our bargaining game turns into a coordination problem between two players who must divide a common surplus equally under the condition of asymmetric information about the size of the surplus. We propose that the initial salient focal point (Schelling, 1960) for the union player is a proposal of 12 points, which represents half of the expected value of the total surplus (24). Moreover, both players know that a proposal of 12 points reflects the highest possible proposal that never leaves the firm player with a loss.

We first develop hypotheses from the perspective that spillovers arise from social comparisons exclusively. Subsequently, we develop hypotheses from the perspective

that spillovers can also arise from rational learning provided that the common surplus is correlated. In both cases, we first evaluate the relationship between the reference outcomes and the opening proposals in the two treatment conditions to establish the initial impact of spillovers, followed by hypotheses about differences in the level of conflict between all three conditions.

Social comparison hypotheses

Opening proposals

The social comparison mechanism assumes that reference outcomes become salient regardless of their association with the actual total surplus. Hence, spillovers are expected to occur under both the UNCORRELATED and the CORRELATED treatment conditions.

The impact of reference outcomes through social comparisons is determined by the salience a negotiator attaches to them relative to the initial salient focal point. Taking into account that players have a self-serving bias, we may well assume that the salience of the reference outcome depends on its favorability to the player. For union players, reference outcomes lower than 12 points are always unfavorable compared to the initial salient focal point, whereas reference outcomes exceeding 12 points become increasingly favorable. We expect that the presence of a favorable reference outcome induces a frame switch from the initial focal point (12 points) to the value of the reference outcome. Hence, we expect the value of the reference outcomes to positively affect trade union negotiators' opening proposals, but only for reference outcomes with a value larger than 12.

In the UNCORRELATED and CORRELATED treatment conditions, higher values of the reference outcome are associated with higher values of the union player's opening proposals. This positive association only exists for values of the reference outcome exceeding 12 points. (Hypothesis 1)

Conflict in bargaining

In the UNCORRELATED treatment condition, reference outcomes have no bearing on the value of the common surplus, and spillovers can only result from social comparisons. Due to self-serving biases, union players increase their demands in the presence of high reference outcomes but ignore low reference outcomes. In contrast, firm players attach salience to relatively low reference outcomes to exploit their presence to achieve agreements that are more favorable to them while not responding to relatively high and therefore unfavorable reference outcomes. As a result, the self-serving biases of both players result in a divergence in proposals between the two players. Hence, the level of conflict in the UNCORRELATED treatment condition will be higher than that in the CONTROL condition, indicated by the difference

between their proposals. In addition, the probability of non-agreement will be higher because higher divergence will make it more difficult to find a mutually acceptable proposal before the deadline.

The divergence in proposals is higher for negotiations in the UNCORRELATED treatment condition than in the CONTROL condition. (Hypothesis 2a)

The probability of non-agreement is higher for negotiations in the UNCORRELATED treatment condition than in the CONTROL condition. (Hypothesis 2b)

Rational learning hypotheses

Opening proposals

Contrary to social comparisons, rational learning will only take place when the reference outcome is correlated with the true value of the common surplus and the players are aware of this. In the UNCORRELATED treatment condition, the common surplus in the negotiation yielding the reference outcome is not known to the players and can be any even value between 12 and 36 with equal probability.

By contrast, in the CORRELATED treatment condition, the correlation of firm states is perfect, and this is common knowledge. Thus, the union player may rationally learn about the feasibility of the proposals in this treatment condition. We assume that the union player holds the belief that firm players will never make or accept a proposal exceeding the value of the common surplus (leaving the firm with a loss).[22] When firm states are perfectly correlated, the reference outcome reveals the minimum value of the common surplus. In the extreme case of an accepted proposal of 36 points, the common surplus is revealed to be 36. For lower reference outcomes, the common surplus is revealed to be in the range between the reference outcome and 36.

If union players expect that the players in other negotiations behave strictly rationally, they cannot improve their information about the common surplus with reference outcomes smaller than or equal to 12 points (the smallest possible value of the common surplus). However, we have already noted that players use fairness considerations as a heuristic in bargaining, anticipating that negotiations will move toward outcomes that represent an approximately equal division of the common surplus. In this case, union players will interpret the reference outcome as representing approximately half of the total surplus and condition their proposals on this information. Consequently, all reference outcomes in the CORRELATED treatment condition are evaluated by the union player as being relevant for ascertaining the

22 This assumption is supported by our experimental findings. Out of 403 observed accepted proposals, only three exceeded the value of the surplus.

common surplus.[23] As a result, the value of the reference outcome should be linearly related to the union player's opening proposals. This leads to the following hypothesis:

In the CORRELATED treatment condition, higher values of the reference outcome are associated with higher values of the union player's opening proposal over the whole range of observed reference outcome values. (Hypothesis 3)

Conflict in bargaining

With the introduction of reference outcomes that reveal information about the state of the firm (in the CORRELATED treatment condition), the information asymmetry between the two players is reduced. This has consequences for the level of conflict in bargaining. Players now know that the reference outcomes hold information about the common surplus, and they know that the other player knows this. Rather than either side attaching salience to 'irrelevant' reference outcomes in a self-serving fashion, as is expected to occur in the UNCORRELATED treatment condition, rational learning implies that the salience of the reference outcomes is dictated by their relevance to the common surplus. Thus, union players' proposals will increase with increasing reference outcomes, but increasing reference outcomes themselves are associated with higher actual values of the common surplus. Moreover, union players are expected to moderate their proposals in the presence of low, unfavorable reference outcomes. For firm players, it will be more difficult to selectively ignore high reference outcomes and hide behind proposals that are far below the equal split of the common surplus. This is a consequence of the union players' knowledge of the correlation between the reference outcome and the value of the common surplus. Compared to the UNCORRELATED treatment condition, self-serving biases are less likely to occur in both players in the CORRELATED treatment condition. We therefore expect less conflict in the latter condition.[24]

The divergence in proposals is lower for negotiations in the CORRELATED treatment condition than in the UNCORRELATED treatment condition. (Hypothesis 4a)

23 Reference outcomes that are lower than half of the lowest possible total surplus (<6) would reveal 'greedy' firm players but may still be indicative of low surplus values if union players expect limited greed. This situation was rare in our experiment, with only 4.7% of the negotiations in the CORRELATED and UNCORRELATED treatments receiving a reference outcomes that took the lowest observed value of 5 points.

24 Note that if spillovers would only result from rational learning, conflict should also be lower in the CORRELATED treatment condition than in the CONTROL condition due to the reduced information asymmetry. In this case, reference outcomes would not affect bargaining in the UNCORRELATED treatment condition at all because there exists no opportunities for learning. Given the well documented effects of social comparisons in previous studies, we do not here formulate these specific hypotheses.

The probability of non-agreement is lower for negotiations in the CORRELATED treatment condition than in the UNCORRELATED treatment condition. (Hypothesis 4b)

2.3 Procedure

We collected our data in October 2012 in the NSM Decision Lab at Radboud University Nijmegen, The Netherlands. The experiment was programmed and implemented in a computerized environment using 'z-Tree' (Fishbacher, 2007). A total of 70 students participated in the experiments, and none participated in more than one session. Each session lasted approximately 1.5 hours excluding the payment of the participants, yielding 14 periods of interaction that will be analyzed in this paper.[25]

Upon entering the laboratory, each participant was randomly assigned to a computer cubicle. The computer program assigned half of the participants in a session to the role of the firm (referred to as PLAYER A in the experiment) and half to the role of the union (referred to as PLAYER B in the experiment). In the first session, the CONTROL condition was implemented (see Appendix A1.1 for the full instructions and screens used in this condition). In the following sessions, the computer program assigned each participant to either the CORRELATED treatment condition or the UNCORRELATED treatment condition (see Appendix A1.2 for the full instructions and screens used in these conditions). Participants remained in the same role and condition throughout. After each period, the participants were randomly re-matched to a different opponent. We collected data on 20 participants in the CONTROL condition, 26 participants in the CORRELATED treatment condition and 24 participants in the UNCORRELATED treatment condition

Participants earned points during the experiment. The exchange rate for these points was 1 point = 6 Euro cents. On average, the participants earned 13.88 Euro (σ=1.56) in the experiment, including the show-up fee of three Euro.[26]

Written instructions for the main experiment were read aloud by one of the experimenters. All of the participants' questions were subsequently answered privately by the experimenters. The participants were then asked to answer a set of test questions to ensure that every participant fully understood the rules of the game and the payoff

25 The players interacted for 15 periods, but due to a software glitch, the variable surplus in the final period of interaction (period 15) did not take the correct value in the CONTROL treatment. As this would eradicate the perfect correlation between the surplus in the reference outcome and the actual surplus in the CORRELATED treatment, we decided not to include the data from this final period in our analyses.

26 The payment also includes small fee for a pen-and-paper pre-experiment unrelated to this study, distributed in all treatments. This pre-experiment lasted a few minutes, and subjects received no feedback about its outcomes before participating the our bargaining game in order to avoid any cross-effects.

structure. All participants passed this test without difficulty. The experiment began with two unpaid trial periods. All participants were paid their earnings in cash immediately after the experiment.

2.4 Experimental evidence

In this section, we first present a graphic representation of the bargaining process for the control condition and the two treatment conditions. Subsequently, we provide a more detailed analysis of the impact of spillovers on the bargaining process, starting with an analysis of the opening proposals and followed by an analysis of the divergence in proposals during bargaining and the probability that non-agreement will occur. Because the values of the common surplus and reference outcomes vary across individual negotiations within the treatments, an aggregate analysis would produce biased results. Therefore, we introduce multivariate analyses that control for these variations as well as for potential biases arising from repeated observations within participants.

2.4.1 The bargaining process: an illustration

Figure 2.1 summarizes all observed union and firm player proposals (N=5,635) during the 60-second bargaining time in the experimental conditions. For each condition, two (loess regression) lines are drawn: one representing the union player's

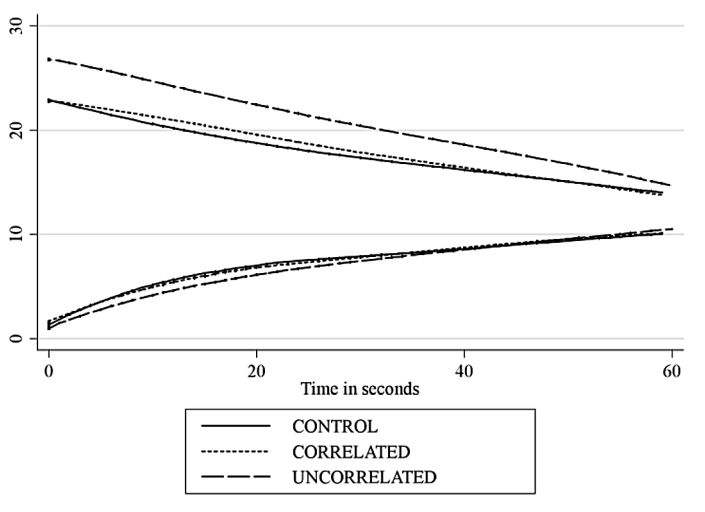

Figure 2.1 Union and firm player proposals over time, loess regression lines

proposals (as expected with a high average starting value and downward slope) and another representing the firm player's proposals (as expected with a low average starting value and an upward slope). Figure 2.1 clearly shows that in all three conditions, the union player's and the firm player's proposals converge during the bargaining process. This finding supports our behavioral assumption that players will converge during bargaining. Figure 1 also provides some initial, preliminary insights into our theoretical expectations. First, we observe that the evolution of union and firm players' proposals is virtually identical in the CORRELATED and CONTROL conditions. In the UNCORRELATED treatment condition, union proposals are noticeably higher early in the bargaining process, resulting in a higher level of divergence. However, the rate at which union proposals decrease and hence the rate at which proposals converge is also higher, resulting in increasingly similar levels of divergence in the three conditions as the deadline approaches. On the aggregate, social comparisons in isolation appear to increase initial conflict, but the bargaining process mitigates this effect.

2.4.2 Multivariate analyses

Opening proposals

Opening proposals are limited to a maximum of 36 points, and this value is disproportionally often chosen. We fit tobit regression models that take into account this censoring with a subject-specific random effect for each union player to control for unobserved heterogeneity. The period of interaction is also controlled by including a continuous period-effect in each model.[27]

The results are presented in Table 2.1. Models 1a and 1b estimate the linear effects of the value of the reference outcomes on the opening proposals in the UNCORRELATED and CORRELATED treatment conditions, respectively. For non-agreement reference outcomes, this variable is set to zero. A dummy variable for these non-agreements is included in all models to control for their potentially differential impact. For Models 2a and 2b, a dummy indicating that the reference outcome exceeds 12 points and its product with the value of the reference outcome are added. In this way, the effect of the reference outcome is conditioned on its position vis-à-vis the hypothesized initial focal point of 12 points, allowing us to test whether the effect of the reference outcome changes when reference outcomes exceed 12 points.

Hypothesis 1 predicts that in both treatment conditions, higher reference outcomes are associated with higher opening proposals, but only when the reference outcome exceeds 12 points. In the UNCORRELATED treatment conditions, there is no

27 Alternative model specifications using a full set of period dummies for all analyses presented in the manuscript did not change our findings.

Table 2.1 Tobit regression estimates of the effects of spillovers on the opening proposals

	UNCORRELATED		CORRELATED	
Model	**1a**	**2a**	**1b**	**2b**
Fixed effects	**b**	**b**	**b**	**b**
Intercept	25.724***	30.812***	16.731***	17.989**
	(2.397)	(2.710)	(2.346)	(2.953)
Period	0.113	0.104	0.374***	0.374***
	(0.085)	(0.080)	(0.086)	(0.087)
Reference outcome = no agreement (dummy)	0.287	-4.696*	2.643	1.401
	(1.383)	(1.891)	(1.487)	(2.301)
Reference outcome	0.014	-0.566**	0.293**	0.147
	(0.099)	(0.191)	(0.106)	(0.228)
Reference outcome		-21.682***		-0.375
>12 (dummy)		(5.728)		(6.201)
Interaction				
Reference outcome*		1.612***		0.105
Reference		(0.380)		(0.419)
outcome > 12 (dummy)				
Wald χ^2 (df)	1.8(3)	21.61(5)***	25.39(3)***	26.05(5)***
Log likelihood	-465.369	-456.124	-510.327	510.037
N	168		182	
N right-censored	19		23	

Estimated random effects are omitted from the table and can be found in Appendix A2, Table A2.1
Standard errors in parentheses
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; two-tailed.

significant linear effect of the reference outcomes (Model 1a). However, Model 1b shows that there is, in fact, a non-linear, V-shaped effect[28], showing that union players significantly increase their opening proposals the more the reference outcomes deviate *in either direction* from the hypothesized initial focal point of 12 points. In line with hypothesis 1, reference outcomes thus lead to higher opening proposals only once they exceed 12 points. However, although no effect was expected for reference outcomes $<$ 12 under hypothesis 1, we find a significant negative effect with increasingly low reference outcomes associated with increasingly high opening proposals. No such non-linear effect is found in the CORRELATED treatment condition. Here, a significant linear effect is found (Model 1b), but there is no evidence that this effect changes when reference outcomes fall below 12 points (Model 2b).[29] This finding supports hypothesis 3, which states that in the CORRELATED treatment condition, the reference outcome value is linearly related to the opening proposals over the whole range of observed outcome values. In this condition, every increase in the reference outcome increases the predicted opening proposal.

Divergence

Divergence is measured by subtracting the current firm proposal from the current union proposal for every proposal made in a negotiation by either player. The resulting value is the difference between union demands and firm offers for every given proposal. The variable measuring divergence is not afflicted by censoring, allowing us to fit linear models. However, each negotiation can have multiple observations (10.8 on average) and is nested within the randomly rematched union and firm players. The data structure is thus observed as divergences nested in negotiations, which are cross-classified in players. Random effects were estimated to account for this data structure. All models include control variables for the period of interaction, the value of the variable surplus and the time within the 60-second bargaining process at which divergence was observed.

In Table 2.2, three models are presented that analyze the level of divergence throughout the bargaining process. By including time as an independent variable, the timing of the observed divergences in the bargaining process is controlled for. The (negative) coefficient of this variable captures the decrease in divergence during the bargaining process, that is, the rate of convergence per second. Model 1 pools all treatments and includes treatment dummies and their interaction with time. In this way, the initial differences in divergence between the conditions are estimated, given

28 The addition of the $>$ 12 dummy and its interaction improves model fit in the UNCORRELATED treatment (LR χ^2 = 18.49; p=0.0001). The effect of the reference outcomes when they are $=<12$ is given by the b of the main effect (-0.566). For reference outcomes $>$ 12, the effect is given by adding the b's of the main effect and the interaction effect (-0.566+1.612=1.046).

29 The addition of the $>$ 12 dummy and its interaction does not improve model fit (LR χ^2 = 0.58; p=0.7486).

by adding the coefficients of the treatment dummies to the intercept. The rate of convergence in each condition is also estimated, given by adding the coefficients of time to the coefficient of the respective interaction term. The (nonlinear) impact of the value of the reference outcomes on divergence during the bargaining process is estimated for the UNCORRELATED treatment condition in Model 2, whereas Model 3 estimates their (linear) impact in the CORRELATED treatment condition.[30]

Divergence is, at least initially, higher in the UNCORRELATED treatment condition than in the CONTROL condition, supporting hypothesis 2a. It is also higher in the UNCORRELATED treatment condition than in the CORRELATED treatment condition, as predicted under hypothesis 4a. However, the rate of convergence is also significantly higher in the UNCORRELATED treatment condition than in the other two conditions.

At values =< 12 points, decreasing reference outcome values lead to increasing divergence in the UNCORRELATED treatment condition. During the bargaining process, this increase in divergence is mitigated. For reference outcomes >12, there is no significant effect.[31] In the CORRELATED treatment condition, divergence linearly increases (decreases) with higher (lower) references outcomes. Here too, the effect is mediated during the bargaining process. Figure 2.2 illustrates the marginal effects and the associated 95% confidence intervals of the value of the reference outcomes on divergence during the bargaining process, taking into account all interaction effects. The upper graph shows the marginal effect in the CORRELATED treatment condition, which is initially positive but decreases over bargaining time and becomes insignificant later in the bargaining process. The lower graph show the marginal effects for reference outcomes =< 12 (dashed line) and for reference outcomes > 12 (tight dotted line). The former is initially negative but increases toward zero over bargaining time and becomes insignificant later in the bargaining process, whereas the latter never reaches significance.

Non-agreements and agreements

Non-agreements are analyzed using logistic regression models, presented in Table 2.3. All models incorporate crossed subject-specific random effects and control for the period of interaction and the value of the variable surplus. In Model 1, all conditions are pooled, and differences in the probability of non-agreement between the conditions are estimated by including dummy variables for the CONTROL condition and the CORRELATED treatment condition, with the UNCORRELATED treatment

30 Additional analyses confirmed that these are the appropriate specifications. Both models were estimated for both treatments and the three-way interaction in Model 2 was omitted in favour of separate estimations for reference outcomes =< 12 and > 12 in the UNCORRELATED treatment.

31 Additional analyses show that divergence is however also higher in the UNCORRELATED treatment than in the CORRELATED treatment for reference outcomes>12.

Table 2.2 Linear regression estimates of the effects of spillovers on the divergence between union and firm proposals during bargaining

	All	UNCORRELATED	CORRELATED
Model	1	2	3
Fixed effects	b	b	b
Intercept	18.706***	28.733***	14.435***
	(1.705)	(2.452)	(1.823)
Time (seconds)	-0.312***	-0.409***	-0.257***
	(0.006)	(0.026)	(0.018)
Period	0.082*	-0.046	0.212**
	(0.041)	(0.076)	(0.067)
Variable surplus	-0.147***	-0.145***	-0.134***
	(0.021)	(0.040)	(0.038)
Treatment (dummy)			
CONTROL	Reference		
CORRELATED	-0.292		
	(2.229)		
UNCORRELATED	5.107*		
	(2.269)		
Interaction	0.005		
Time*CORRELATED	(0.007)		
Time*UNCORRELATED	-0.044***		
	(0.007)		
Reference outcome = no agreement (dummy)		-2.523	3.341*
		(1.939)	(1.324)
Reference outcome		-0.476*	0.309**
		(0.198)	(0.097)

Reference outcome > 12 (dummy)		-7.694	
		(5.889)	
Interactions			
Reference outcome*Reference outcome > 12 (dummy)		0.634	
		(0.391)	
Time*Reference outcome = no agreement (dummy)		0.033	-0.058**
		(0.028)	(0.020)
Time*Reference outcome		0.006*	-0.006***
		(0.003)	(0.001)
Time*Reference outcome > 12 (dummy)		0.204*	
		(0.097)	
Time*Reference outcome*Reference outcome > 12 (dummy)		-0.016*	
		(0.006)	
Wald χ^2 (df)	13999.83(7)***	5922.81(11)***	4671.59(7)***
Log likelihood	-14362.752	-5134.062	-5425.785
N observations	5232	1869	1969
N negotiations	484	166	180

Estimated random effects are omitted from the table and can be found in Appendix A2, Table A2.2
Standard errors in parentheses
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; two-tailed.

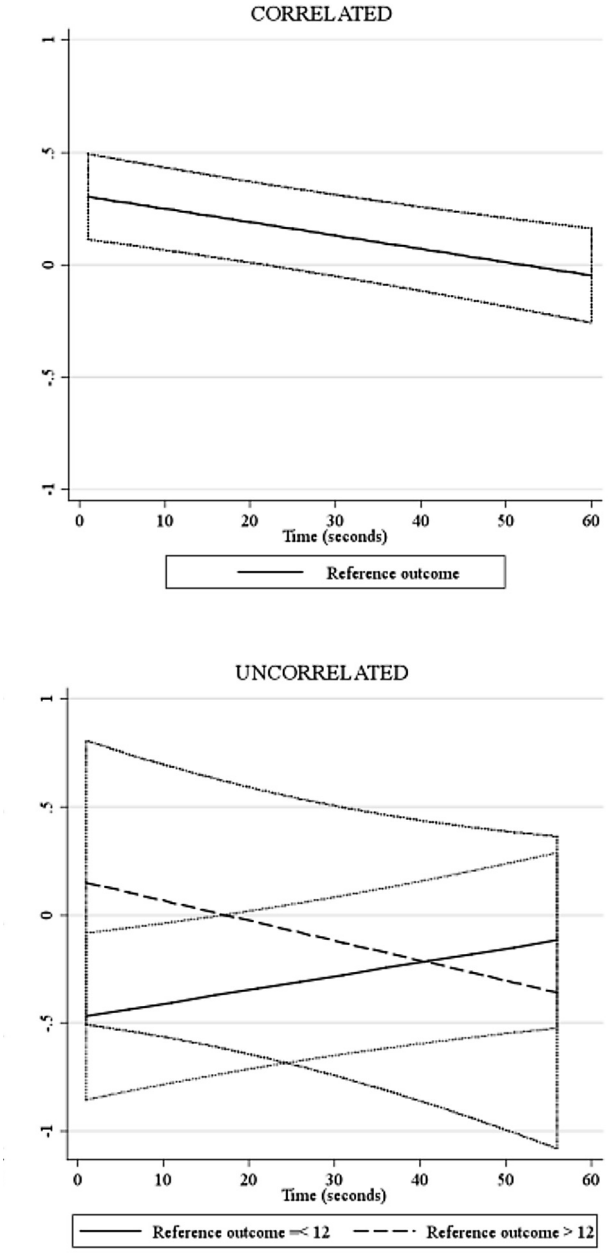

Figure 2.2 Marginal effect of reference value on divergence (95% CI)

Table 2.3 Logistic regression estimates of the effects of spillovers on non-agreement probabilities

	ALL	CORRELATED	UNCORRELATED
Model	**1**	**2**	**3**
Fixed Effects	**b**	**b**	**b**
Intercept	-1.046**	-1.274	-1.442*
	(0.349)	(1.028)	(1.248)
Period	-0.077*	-0.074	-0.050
	(0.032)	(0.054)	(0.055)
Variable surplus	-0.104***	-0.098**	-0.151***
	(0.018)	(0.033)	(0.036)
Treatment			
CONTROL	0.011		
	(0.399)		
CORRELATED	-0.292		
	(0.382)		
UNCORRELATED	Reference		
Reference outcome = no agreement (dummy)		-0.410	-0.128
		(1.001)	(1.239)
Reference outcome		-0.006	0.016
		(0.079)	(0.127)
Reference outcome > 12 (dummy)			-8.320
			(4.391)
Interaction			
Reference outcome*Reference outcome > 12 (dummy)			0.490
			(0.278)
Wald χ^2 (df)	35.88 (4)***	11.18(4)**	18.24(6)**
Log likelihood	-206.306	-71.436	-68.520
N	490	182	168

Estimated random effects are omitted from the table and can be found in Appendix A2, Table A2.3

[b] logit estimate, standard error in parentheses

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; two-tailed.

Table 2.4 Summary of findings

Hypothesis		Findings
1	In the UNCORRELATED and CORRELATED treatment conditions, higher values of the reference outcome are associated with higher values of the union player's opening proposals. This positive association only exists for values of the reference outcome exceeding 12 points.	Partially supported for the UNCORRELATED treatment condition (the effect changes direction below 12)
2a	The divergence in proposals is higher for negotiations in the UNCORRELATED treatment condition than in the CONTROL condition.	Supported
2b	The probability of non-agreement is higher for negotiations in the UNCORRELATED treatment condition than in the CONTROL condition.	Refuted
3	In the CORRELATED treatment condition, higher values of the reference outcome are associated with higher values of the union player's opening proposal over the whole range of observed reference outcome values.	Supported
4a	The divergence in proposals is lower for negotiations in the CORRELATED treatment condition than in the UNCORRELATED treatment condition.	Supported
4b	The probability of non-agreement is lower for negotiations in the CORRELATED treatment condition than in the UNCORRELATED treatment condition.	Refuted

condition serving as the reference category. The effect of the reference outcome value on the probability of non-agreements is estimated for the CORRELATED treatment condition in Model 2 and the UNCORRELATED treatment condition in Model 3. This effect is modeled, following the functional form established in the previous analyses, with a linear effect in Model 2 and a non-linear effect that changes at 12 points in Model 3.

The estimates for the CONTROL and CORRELATED dummies in Model 1 are not significant, indicating that there are no differences in the probability of non-agreement between the UNCORRELATED treatment condition and the other two conditions. This finding refutes hypothesis 2b and hypothesis 4b, which predict a higher probability of non-agreement in the UNCORRELATED treatment condition than in the CONTROL condition and the CORRELATED treatment condition, respectively. Model 2 and Model 3 show that the value of the reference outcome does not significantly affect the occurrence of non-agreements in either of the treatment conditions.

We also estimate the impact of the reference outcome value on the agreements, that is, the value of the accepted proposals (Appendix A2, Table A2.4), in both treatments, testing for a linear effect as well as a non-linear effect that changes when reference outcomes exceed 12 points. The findings show that accepted proposals linearly increase with the value of the reference outcome in the CORRELATED treatment condition. In the UNCORRELATED treatment, accepted proposals also increase with the value of the reference outcome but only when it exceeds 12 points, whereas there is no significant relationship with the accepted proposals when the reference outcomes are below 12 points.

2.5 Conclusion

We aimed to investigate how information about other negotiations influences conflict in bargaining under conditions that only allow for social comparisons and conditions that also allow for rational learning. Six hypotheses were tested with the aid of a bargaining experiment. An overview of our findings is presented in Table 2.4.

The social comparison mechanism is sufficient to induce spillovers. These spillovers result in increased levels of conflict as measured by the divergence of union and firm proposals compared to bargaining without spillovers. However, the nature of spillovers changes when rational learning is possible, such that conflicts resulting from social comparisons and self-serving biases are prevented. Learning itself is facilitated by the union's anticipation of the impact of equity and fairness on observed outcomes in other negotiations, which are interpreted as equal splits.

When learning is possible, union demands and the level of conflict decrease with lower reference outcomes. However, when spillovers result from social comparisons

exclusively, increasingly low and unfavorable (i.e., below the initial salient focal point) reference outcomes lead to higher union demands and more divergence. This latter finding may be attributable to unions' escalation of their demands when confronted with reference outcomes that are increasingly unfavorable to them but are fundamentally irrelevant to the firm's ability to pay in an effort to prevent the potential self-serving exploitation of such reference outcomes by the firm.

As a caveat to the interpretation of studies relying on one-shot games, our findings suggest that the impact of spillovers on conflict is strongly mitigated when negotiators are allowed to bargain interactively. However, higher reference outcomes translate into more eventually accepted proposals, both when learning is possible and when spillovers result from social comparisons. In the latter case, this effect only holds for reference outcomes that are favorable to the union compared to the initial salient reference point.

Previous studies of the impact of spillovers on conflict in wage bargaining yielded conflicting results. A potential explanation is that social comparisons and rational learning are theoretically and empirically intertwined. Spillovers do not occur only when they provide information relevant to firms' ability to pay. Comparisons matter and can lead to conflicts. Where opportunities for learning are relatively abundant, however, conflicting interpretations of reference outcomes may be reduced. The presence of conflict-decreasing spillovers could consequently result from the mitigation of social comparisons rather than being indicative of conflict-decreasing effects in their own right.

One might argue that learning does not take place at all and that conflict reduction simply results from increasing the salience of potential reference points for social comparisons. However, in our design, this increase in salience would be due to informing the players of the identical surplus value, that is, making learning possible. This raises the question of whether salience can be boosted for a similar effect without creating possibilities for learning; this is a question that future research should address. Moreover, our study raises the question of whether and how the relative impact of social comparison effects and rational learning could be varied when both mechanisms can operate. Furthermore, additional treatments may be explored that incorporate reference outcomes from negotiations with an unknown range and probability of common surplus values of the other pair or with information about the exact common surplus value of the other pair.

Another potential extension of this research is the incorporation of spillovers that reveal information about the costs and benefits of conflict (see also Chapter 5) by modeling correlations between the outside options in different bargaining units. Empirical research using natural data may benefit from recognizing that average effects may capture different and potentially counteracting spillover effects. Survey data of negotiators may help to systematically identify salient reference points (e.g., Babckock et al. 1996; Bewely, 1999).

3

Horizontal and vertical spillovers in wage bargaining: experimental evidence[32]

32 A slightly different version of this chapter has been submitted for publication in *Group Decision and Negotiation* (current status: under review). An earlier version of this chapter was presented at the IREC – ESA-RN 17 Joint Conference in Dublin, Ireland, September 2014. Co-authors are Jana Vyrastekova, Agnes Akkerman and René Torenvlied.

Abstract

Conflict in wage bargaining is affected by information about other bargaining units and information about the past of the bargaining unit. We develop a theoretical framework for such spillovers and detail four distinct mechanisms. Rational learning and social comparisons are reviewed as mechanisms for the influence of information about other bargaining units, and reputation and expectation effects are reviewed as mechanisms for the influence of information about the past of the bargaining unit. Building upon a previous experimental study, we implement an unstructured, time-limited, two-person bargaining game with asymmetric information and investigate the impact of reputation and expectation effects. The experimental treatments vary with respect to spillover-inducing information available to the participants. The results suggest that reputation effects decrease conflict, whereas expectation effects tend to increase conflict. Moreover, reputation effects diminish the influence of social comparisons but can augment the effects of rational learning.

[An employee] '…feels, not only that his interests have been damaged […] but also that he has been cheated of a legitimate expectation […] if […] an employer merely refuses a demand for an advance made on the ground of fairness – because wages in similar firms, or associated trades, are rising.' (Hicks, 1932: 138)

'If an employer cuts wages too far [...] He will get the reputation of standing out for the last penny when he gets the chance […]. "Bad employers", it appears to the workman, are people who seize every chance of cutting rates; "good" employers have not this bad habit, and consequently maintain better relations.' (Hicks, 1932: 55)

3.1 Introduction

In his seminal work *The Theory of Wages*, Hicks (1932) explicitly recognized that conflict in wage negotiations is affected by the negotiations' social and historical context. However, in most models of wage bargaining offered by the scholars that followed in Hicks' footsteps, negotiations were treated as independent events (see Ashenfelter and Johnson, 1969 and the ensuing literature). In recent decades, however, mounting empirical evidence for patterns of influence between negotiations in different bargaining units has emerged (e.g., Babcock, Wang and Loewenstein, 1996; Babcock Engberg and Greenbaum, 2005; Gu and Kuhn, 1998; Kuhn and Gu, 1998, 1999; Lehr et al., 2014, 2015). There is also growing empirical evidence that there exist patterns of influence between past and present negotiations within the same bargaining unit (e.g., Mauro, 1982; Schnell and Gramm, 1987; McConnell, 1989; Campolieti, Hebdon and Hyatt, 2005, Lehr et al., 2014, 2015; c.f. Blinder and Choi, 1990; Agell and Lundborg, 1995, 2003; Bewely, 1999). We refer to patterns of influence between negotiations as 'spillovers'. If spillovers occur *between different bargaining units*, we refer to them as 'horizontal spillovers'. If spillovers occur between past and present negotiations *within the same bargaining unit*, we refer to them as 'vertical spillovers'.[33] This paper studies the impact of these spillovers on conflict as indicated by the divergence between union demands and firm offers in wage bargaining.

Even though conflict in wage bargaining is known to be subject to both horizontal *and* vertical spillovers, very little is known about the *joint* impact of these different spillovers. Moreover, various theoretical mechanisms have been proposed as explanations for either type of spillover. These mechanisms are based on one of two core assumptions. One of these assumptions is that that spillovers occur because

33 We borrow this terminology from evolutionary medicine and memetics, where diseases, ideas or behaviour may spread across members of the same species (horizontal transmission), or over successive generations within the same family (vertical transmission).

information about other negotiations allows principally rational negotiators to reduce their uncertainty about private information aspects of their own current negotiations. The alternative assumption relaxes rationality assumptions and states that spillovers occur because information about other negotiations changes the preferences of negotiators in their own current negotiations.

The theoretical mechanisms based on these different assumptions yield contradictory predictions about the impact of spillovers on conflict in wage bargaining. Moreover, the different spillover mechanisms have predominantly been studied separately without taking into account their joint impact and potential interactions. What is lacking is 1) a coherent framework within which to study the horizontal and vertical spillovers resulting from different mechanisms and 2) adequate knowledge of the impact of spillovers resulting from different and possibly simultaneously operating mechanisms on conflict. This knowledge gap is aggravated by empirical difficulties in adequately identifying spillovers using traditional econometric data[34] related to the inherently ambiguous choice of appropriate reference negotiations to investigate and the potential for spurious correlations due to environmental factors.

In this study, we present a theoretical framework for studying horizontal and vertical spillovers, each resulting from different mechanisms. Building on a previous study of horizontal spillovers (Chapter 2) taken in isolation, we study the impact of vertical spillovers in an environment that also allows for horizontal spillovers using a bargaining experiment. Two causal mechanisms for vertical spillovers are investigated: reputation effects and expectation effects. We thus address the following research question: *how do vertical spillovers resulting from reputation effects and expectation effects influence conflict in wage bargaining?*

The experimental method allows for complete control over the information available to the negotiators and therefore offers three important benefits: 1) the choice of investigated reference negotiations becomes unambiguous; 2) spurious correlations due to environmental factors are prevented; and 3) the ability to manipulate the information available to the negotiators enables us to identify different mechanisms as causes of spillover.

We implement a two-person (union and firm negotiator) unstructured bargaining game with asymmetric information using a 2x2 treatment design and a control condition. The treatment conditions provide subjects with information about the negotiations of others. One treatment condition varies whether the firm negotiator in the other negotiation

34 Establishing horizontal spillovers is complicated by the necessarily a priori and to some extent arbitrary choice of investigated reference negotiations, and sensitive to spurious correlations (c.f. Mitchell, 1982; Manski, 1993). For vertical spillovers, the appropriate reference negotiation less ambiguous but the separation of 'true' influences from the past (i.e. state dependence) from the influences of unobserved variables affecting repeated bargaining events (i.e. population heterogeneity) is often problematic (c.f. Heckman, 1991).

has an unknown ability to pay or the other firm negotiator has an identical ability pay. The other treatment varies whether subjects receive information about the firm negotiator's relative earnings in the previous negotiation. We analyze the impact of the resulting horizontal and vertical spillovers on the level of conflict between the union and firm negotiators as indicated by the divergence between their proposals during the bargaining process.[35]

3.2 Theoretical framework

3.2.1 Basic assumptions

The theoretical framework presented here is based on a number of assumptions. First, we assume that wage bargaining can be modeled as the division of an economic surplus (Abowd, 1989)[36], the value of which is known to the firm but not to the union.[37] This information asymmetry entails that only a firm knows about its own state, that is, how much is 'on the table' in the negotiation.[38] There is abundant empirical evidence that this fundamental information asymmetry in wage bargaining is one of the chief causes of conflict (Hayes, 1984; Kennan and Wilson, 1989; McConnell, 1989; Card, 1990; cf. Cramton and Tracy, 2003). Second, we assume that in addition to uncertainty about the state of the firm, wage bargaining is characterized by negotiators' uncertainty about the type of their opponent, who may be 'greedy' or 'fair'. Thus, wage bargaining takes place in a context of 'state uncertainty' and 'type uncertainty' due to private information about these aspects. Third, we assume that negotiators will use information that allows them to reduce each of these uncertainties. This entails that spillovers can result from a process of uncertainty reduction about private information aspects through the use of information about other negotiations. Fourth,

35 We do not analyze potential differences in the probability of non-agreements occurring. Our previous findings (Chapter 2) strongly suggest spillover effects on conflict do not persist throughout the bargaining process and consequently do not change non-agreement rates in this experimental design. Additional analyses confirmed this pattern for the effects studied here.

36 I.e. we consider the distributive rather than the integrative aspect of bargaining (c.f. Walton and McKersie, 1965).

37 Although popularized in the game theoretic bargaining literature of the 1980's, the notion that workers and their representatives are at an information disadvantage compared to employers regarding the latter's ability and willingness to bear the cost of labor, and that this information asymmetry leads to conflict, can be traced back as far as the work of Hicks (1932: 139) and Marx ([1853]in Lapides 1987: 47).

38 It may be argued that wage bargaining is about the division of an economic surplus that will be realized in the future and, as the future is uncertain, firm's do not posses perfect information about the size of the surplus. The information asymmetry in this case is about the firm's willingness to pay rather than about its ability to pay. It is however reasonable to assume that firms do hold superior information about their future state and that their expectations about their future ability to pay are major determinants of their current willingness to pay. Consequently, whether information asymmetry is viewed as relating to their 'willingness to pay' or 'ability to pay' is not crucial for the theoretical considerations presented here.

we assume that negotiators' preferences are reference-dependent (cf. Tversky & Kahneman, 1979). Consequently, comparisons to reference points affect negotiators' preferred outcomes. This entails that spillovers can result from negotiators' reference-dependent preferences, which are affected by information about other negotiations. The third and fourth assumptions are the underpinnings of two mechanisms for horizontal spillovers and two mechanisms for vertical spillovers. These mechanisms are summarized in Table 3.1 and will now be discussed in more detail.

Table 3.1 Four mechanisms of spillovers

Type of spillover	Basic assumption	
	Uncertainty reduction about private information	Reference-dependent preferences
Horizontal	*Rational learning*	*Social comparisons*
Vertical	*Reputation effects*	*Expectation effects*

3.2.2 Uncertainty reduction about private information: rational learning and reputation effects

The assumption that spillovers take place because negotiators use information about other negotiations to reduce uncertainty about private information is the basis for two mechanisms: 1) rational learning, which causes horizontal spillovers, and 2) reputation effects, which cause vertical spillovers.

Horizontal spillovers due to *rational learning* occur when the ability of different firms to pay wages is positively correlated, such as when these firms operate in the same sector and therefore face identical product market conditions or technological shocks. When such a correlation is present, unions can reduce their uncertainty about the state of the firm they are bargaining with by observing negotiations in similar firms (Burgess, 1988; Kuhn and Gu 1999). Unions then base their demands on the observed settlements (or strikes) in other bargaining units. Note that in this case, unions are only affected by information about other bargaining units because this allows them to reduce their uncertainty about the firm's ability to pay; that is, the use of this information is strictly rational. This mechanism for horizontal spillovers may consequently be referred to as '*rational learning*'. Because the initial information asymmetry between the union and the firm about the firm's ability to pay is an important cause of conflict, the rational learning mechanism leads to the prediction that horizontal spillovers reduce the level of conflict in bargaining.

Vertical spillovers due to *reputation effects* occur when negotiators have information about the past behavior of the opposing negotiator. Under the assumption that

behavioral types are stable, this information allows negotiators to reduce their uncertainty about the behavioral type of the opposing negotiator, which is strictly rational in this sense. The effect of information about these stable behavioral patterns, or reputations (cf. Roth and Schoumaker, 1983, Kreps and Wilson, 1982, Abreu and Gul 2000), on other negotiators' bargaining behavior thus constitutes a mechanism for vertical spillovers. Reputation effects become especially important when there exists some information asymmetry between actors that interact repeatedly (cf. Milgrom and Roberts, 1981). These conditions are clearly present in wage bargaining, which occurs at regular intervals for any bargaining unit and in which firms know their behavioral type and their ability to pay, whereas unions are uncertain about these aspects of the negotiation. Conversely, firms are uncertain about the behavioral type of the union; hence, both sides of the bargaining table may build reputations. However, it is particularly the firm's reputation that is of interest. The firm's reputation not only conveys information about its behavioral type to the union but indirectly also conveys information about the firm's state, namely, its ability to pay. Thus, 'type uncertainty' is not independent from 'state uncertainty' here. Although a firm's offers may reveal its state to the union, the credibility that unions assign to these offers will depend on the type of firm it believes it is negotiating with based on the firm's reputation.

We argue that the reputation mechanism offers a way of reducing the level of conflict in bargaining. In principle, firms can abuse their informational advantage by convincing unions to accept relatively low wages even when the firm's ability to pay is actually high. However, at some time after the wage agreement is signed, the firm's true ability to pay will be revealed, such as through accounting information in financial statements. Unions are then able to ascertain the fairness of past wage offers. The firm would consequently enter future negotiations with a reputation for greediness, and the union would no longer interpret the firm's wage offers as an accurate representation of its ability to pay. However, when firms make wage offers or accept wage demands that represent a fair share of common economic surplus, they create a reputation that credibly signals their fairness to the unions. This reputation insures that the unions will continue to take firms' wage offers in future negotiations as reflections of the firms' ability to pay and mitigate their demands or lowest acceptable offers in response to the firms' bargaining behavior. Especially when economic circumstances adversely affect firms' ability to pay, their reputations may help convince unions to accept a low offer or to lower their demands. The unions then interpret the firms' offers as a credible signal of a low ability to pay rather than posturing. In the organizational literature, it is particularly well recognized that firms can benefit from investing in positive reputations (Lange, Lee and Dai, 2011), including reputations for being good employers (e.g., Turban and Cable, 2003). Indeed, a qualitative analysis of wage setting in the US (Bewley, 1999) suggests that reputations

that inspire trust in management among unions and employees are highly beneficial for firms seeking to peacefully restrain wage increases or even cut wages when they face economic adversity.

3.2.3 Reference-dependent preferences: social comparisons and expectation effects

The assumption that spillovers take place because negotiators' preferences are reference-dependent is also the basis for two mechanisms: 1) social comparisons, which cause horizontal spillovers, and 2) expectation effects, which cause vertical spillovers.

Horizontal spillovers due to *social comparisons* occur when individuals compare themselves to relevant others[39] (cf. Festinger, 1954). In the wage bargaining context, such comparisons entail that the wage rate in one firm influences what workers in another firm consider acceptable wages (Rees, 1993; Bewely, 1999; Babcock et al. 2005). Thus, bargaining outcomes in other firms become reference points (cf. Tversky & Kahneman, 1979) for the workers. Because union negotiators represent the interests of these workers, the result is that the union negotiators' preferences in bargaining will be affected by information about bargaining outcomes in other firms. Firm negotiators are less susceptible to making comparisons due to their superior information about their own ability to pay (see also Chapter 2). However, there is no a priori reason to believe that the firm negotiators are immune to making comparisons. However, union and firm negotiators are likely to take different negotiations as salient reference points. Although the union will perceive relatively high wages achieved elsewhere as more attractive reference points, the firm negotiator will prefer to be guided by relatively low wages elsewhere. This 'self-serving bias' in the evaluation of reference points (Babcock et al. 1995, 1997) will increase the divergence between the union negotiators' preferences and the firm negotiators' preferences and hence the level of conflict in bargaining.

Vertical spillovers due to *expectation effects* occur when individuals compare their potential future outcomes to their past outcomes. In the wage bargaining context, past wage agreements become reference points against which workers and negotiators evaluate potential future wages. In this way, information about past negotiations and their outcomes leads to expectation effects.

As with social comparisons, there is no a priori reason to believe that firm negotiators are immune to expectations, but their knowledge of their own ability to

39 Note that social comparisons could also be interpreted as a way of reducing uncertainty. However, it is not uncertainty about fundamental aspects of the bargaining situations and that are subject to private information that is reduced, but rather the uncertainty an actor experiences about his own opinions and evaluations. Under strict rationality assumptions, these uncertainties are irrelevant and consequently would not result in spillovers.

pay limits the impact of such expectations. As with social comparisons, it is also important to recognize that the way negotiators evaluate past wages as reference points is guided by bias. The guiding bias in this case is loss aversion (Tversky and Kahneman, 1991), or the predisposition of human beings to avoid outcomes that entail a loss when compared to another situation deemed relevant. The importance of expectation effects is highlighted by empirical research. Wages are found to be history-dependent (Card, 1990); past wages are an important determinant of future wages. Extensive qualitative research (Bewley, 1999) indicates that workers have strong preferences to retain at least their previous wage level under a new contract. Previous wage levels thus become workers' initial minimum acceptable new wage levels, and this is echoed by the union negotiators. These expectation effects lead to increasing levels of conflict in bargaining when firms are not able to meet expected wages due to economic setbacks.

3.2.4 The model

We model wage bargaining as a two-person unstructured bargaining game with asymmetric information. The common surplus to be divided has a value that is randomly drawn for each negotiation from a uniformly distributed set of possible values (see Chapter 2). Firm players know the exact value of the common surplus; union players only know the set of possible values and that each value has equal probability of being realized. Bargaining starts with a proposal by the union player, analogous to trade unions' initial wage demands in wage bargaining. The bargaining process is time limited, and bargaining time is common knowledge. At any moment within the allotted bargaining time, both players are free to either wait, make (an unrestricted number of) proposals, or accept the other player's most recent proposal. Proposals are bound between zero and the highest potential surplus value, and they represent the union players' earnings if accepted (i.e., the 'wage rate'). The firm players' earnings are defined as the common surplus minus the accepted proposal (i.e., the residual profit after the cost of labor is deducted). Bargaining ends if a proposal is accepted or if the allotted bargaining time expires. If no proposal is accepted before the deadline, the two players earn the non-agreement payoff of zero points. The value of the non-agreement payoffs is common knowledge.

The bargaining model captures wage bargaining as an interactive process of decision making with a time-increasing risk of suffering the cost of not reaching an agreement. This reflects that in wage bargaining, both sides of the bargaining table have incentives to aim for the highest possible outcome for themselves but evaluate this outcome against the cost of potential conflict (such as strikes, lockouts, or the termination of the bargaining unit). The model makes a number of simplifying assumptions, most importantly the following: 1) either side of the bargaining table is treated as a unitary actor (cf. Ross, 1948; Ashenfelter and Johnson, 1969); 2) outside

options are equal and common knowledge, which means that either side suffers identical costs from not reaching an agreement and knows that these costs are the same for their bargaining partner; 3) players cannot withdraw from bargaining before the deadline; there are no spontaneous strikes or lockouts.

3.2.5 Experimental design

We implement a repeated bargaining game over the division of a common surplus that is defined as 24 points plus a number of additional points. The number of additional points can be any even number between -12 and 12 with equal probability and is randomly selected from the set of possible values in each period. The common surplus could consequently be as low as 12 points or as high as 36 points in any given period. The union player only knows that the total surplus will be 24 points plus the variable surplus. The firm player knows the number of additional points and therefore the actual value of the common surplus.

Each pair of players bargains by making proposals that represent the number of points that, if accepted, the union player will receive. Negotiations start with an opening proposal by the union player, after which both players are free to either make any number of proposals in the 0-36 range or accept the other player's most recent proposal. Bargaining time is limited to 60 seconds. During bargaining, the history of proposals can be seen by both players. When a proposal is accepted, the union player earns the number of points represented by that proposal, whereas the firm player earns 24 points *plus* the additional number of points *minus* the proposal. After each completed negotiation, the players are privately informed about their own payoffs. There is no communication between the players other than through the proposals that they make.

The bargaining game is repeated for 15 periods. One set of 15 values for the additional points is randomly drawn before the first experimental session and subsequently used for all bargaining units in all sessions. The participants are randomly matched to a different opponent in each period.

We implement 2x2 experimental treatment conditions and a control condition. In the CONTROL condition, which was administered in the first session, the bargaining game is executed as described above. In the treatment conditions, which were administered in the subsequent sessions, the identical bargaining protocol is implemented but with additional information for the players. This additional information is used to induce horizontal and vertical spillovers. The complete experimental instructions and bargaining screens are reported in Appendix A1.1 for the CONTROL condition, in Appendix A1.2 for the CORRELATED and UNCORRELATED treatment conditions, and in Appendix A1.3 for the CORRELATED/REPUTATION and UNCORRELATED/REPUTATION treatment conditions. An overview of the conditions is provided in Table 3.2.

Table 3.2 Overview of conditions

	Information about firm players previous share earned	
Reference outcomes	No	Yes
No	CONTROL	
From negotiations with identical common surplus	CORRELATED	CORRELATED/REPUTATION
From negotiations with unknown common surplus	UNCORRELATED	UNCORRELATED/REPUTATION

Horizontal spillovers

We induce horizontal spillovers that do not allow for rational learning in the UNCORRELATED treatment condition. We induce horizontal spillovers that allow for both rational learning and social comparisons in the CORRELATED treatment condition. In both treatment conditions, we provide the two players with information about a negotiation outcome of one other pair, which we refer to as the '*reference outcome*'. Both players receive the same reference outcome. This reference outcome informs players about the accepted proposal in one other negotiation (i.e., the number of points earned by the union player) or that there was no agreement if there was no proposal accepted in the other negotiation. The participants are truthfully informed that the reference outcomes are actually observed outcomes under the same bargaining protocol.[40] The reference outcome appears on the screen below a statement reading 'Information about negotiation outcome of one other pair' and is visible throughout the bargaining process.

For the UNCORRELATED treatment condition, the reference outcome is taken from a negotiation in which the number of additional points was unknown to the negotiators receiving the reference outcome. The players received a statement below the reference outcome saying, 'The number of additional points in this other pair was one of the numbers {-12,-10,-8,-6,-4,-2,0,2,4,6,8,10,12}, all equally likely.' In this treatment condition, the players cannot rationally improve their knowledge about the size of the common surplus with the aid of the reference outcomes. Horizontal spillovers are consequently assumed to be attributable to social comparisons exclusively in this treatment.

For the CORRELATED treatment condition, the reference outcome comes from a negotiation with an identical number of additional points. We inform the participants about this via a statement above the reference outcome that says, 'The number of additional points in this other pair was EXACTLY THE SAME as it is now in your pair.' Because firm states are correlated in this treatment and the players are aware of this,

40 The reference outcomes were in fact selected from the observed outcomes in the CONTROL treatment.

the reference outcomes can inform about the size of the common surplus and thus enable rational learning.

In each treatment session, half of the players are randomly assigned to the UNCORRELATED treatment condition and the other half to the CORRELATED treatment condition. In both treatments, two randomly selected bargaining pairs in each period receive a non-agreement as a reference outcome, indicated by the statement, 'There was DISAGREEMENT'. The remaining pairs receive information about an agreed outcome. To identify the impact of the value of the reference outcomes within each treatment, we systematically vary this value in both treatments by selecting the highest appropriate observed reference outcome for half of the pairs and the lowest appropriate observed reference outcome for the other half of the pairs.

Vertical spillover

Establishing the precise impact of expectations and reputations necessitates careful isolation of the impact of these mechanisms from confounding factors that would arise from repeated interactions between the same subjects, such as emotional dynamics. We therefore implement a random re-matching procedure after each period. In this way, the anonymously interacting subjects repeat the same bargaining game in every period but do not have a history with their opposing subject. This design departs from the stable bargaining units common in real wage bargaining but offers a superior means to analyze the impact of information about previous bargaining periods on the behavior of individual subjects.

To incorporate the reputation mechanism, we provide the players with information about the firm player's past behavior, specifically the percentage share of the common surplus the firm player earned in the previous period. If no proposal was accepted in the firm player's previous negotiation, the information showed that there was disagreement. This information was provided in an otherwise identical replication of the UNCORRELATED and CORRELATED treatment conditions, yielding the UNCORRELATED/REPUTATION and CORRELATED/REPUTATION treatment conditions.

Expectation effects may occur in all five experimental conditions. This is because all union players bargain repeatedly (15 times in total), and thus the outcome of each negotiation may become a reference point against which subsequent outcomes are compared. It must be noted that the value of the additional number of points, and thus the value of the common surplus, is independently and randomly chosen for each period. Consequently, the union players cannot rationally improve their knowledge of the value of the common surplus with information about their outcomes in previous periods. If past outcomes have an influence on subsequent bargaining behavior, this is exclusively attributable to the reference-dependent preferences of the players.

3.2.6 Summary of previous findings

This study builds upon a previous study (see Chapter 2) on the impact of horizontal spillovers on conflict using data from the CONTROL, UNCORRELATED and CORRELATED treatment conditions. We first summarize the findings of that study and then discuss the hypotheses about vertical spillovers we test with the current, more elaborate set-up.

In the previous study, we found that conflict, as measured by the level of divergence between union and firm players' proposals, is increased by horizontal spillovers resulting from social comparisons in the UNCORRELATED treatment condition. In particular, the union players, who do not know the value of the common surplus, adapt their behavior in response to the reference outcomes. The nature of this effect takes two distinct forms depending on the favorability of the value of the reference outcome vis-à-vis the initial focal point (cf. Schelling, 1960) of 12 points.[41] First, in the case in which reference outcomes exceed 12 points, the *higher* the value of the reference outcomes is, the higher the union players' proposals are. Second, in the case in which reference outcomes are lower than 12 points, the *lower* the value of the reference outcomes is, the higher the union players' proposals are. This second effect is likely a consequence of the union players' attempts to prevent increasingly unfavorable reference outcomes from gaining salience in the negotiation by increasing their demands. Because firm players do not respond to the reference outcomes regardless of their value, divergence increases in both cases. As a result of these conflict-increasing influences of social comparisons, divergence is much higher on average in the UNCORRELATED treatment condition than in the CONTROL condition.

In the CORRELATED treatment condition, the common surplus values in the negotiations under analysis and the negotiations from which the reference outcomes are taken are perfectly correlated. Hence, union players can rationally learn about the value of the common surplus by observing the reference outcomes. Assuming that union players interpret reference outcomes as approximate equal splits[42] of the common surplus, they reveal a lower bound on the current common surplus value. Thus, in addition to social comparisons, horizontal spillovers can occur due to rational learning in the CORRELATED treatment conditions. As a result of the feasibility of rational learning, there is much less conflict as measured by divergence in the

41 12 points is the initial focal point in our bargaining game because it represents exactly the equal split of the the expected value of the common surplus (24 points) and because it represents the highest proposal that, if accepted, would never result in losses for the firm player. As a consequence, reference outcomes that are larger than 12 points can be considered favourable to the union player, while reference outcomes that are smaller than 12 points can be considered unfavourable.

42 A less far reaching assumption would be that union players assume that firm players would not accept proposals that exceed the common surplus, i.e. leave them with a loss. In this case, learning can still take place, but only when proposals exceed the lowest possible value of the common surplus (12 points). Our previous study however suggests that the equal split heuristic is used.

CORRELATED treatment condition than in the UNCORRELATED treatment condition. However, we also find that conflict is not lower in the CORRELATED treatment condition then in the CONTROL condition, even though theoretically, rational learning implies that the information asymmetry between the union and firm players is reduced in the CORRELATED treatment condition. This finding is in line with the previous findings of Tournadre and Villeval (2004), who show that although horizontal spillovers that allow for rational learning decrease conflict, this decrease of conflict is less than what would be predicted if horizontal spillovers resulted from rational learning exclusively (cf. Kuhn and Gu, 1999). Rather than decreasing conflict in its own right, making rational learning possible appears to prevent the conflicts that arise from horizontal spillovers driven by social comparisons.

3.2.7 Hypotheses

We expect that the bargaining process will reflect the players' incentives such that initially, union players will make relatively high proposals and firm players will make relatively low proposals. This initial conflict, expressed by the *divergence* of union and firm proposals, will decrease over time as the bargaining deadline and the non-agreement payoff of zero points draw closer and proposals consequently converge.

A particularly robust finding in the experimental literature analyzing structured games such as the ultimatum game is that subjects tend to deviate from the sub-game-perfect equilibrium strategy (i.e., offer/accept the smallest possible amount) by settling on approximations of the equal split of the common surplus value (see Thaler, 1988; Güth and Tietz, 1990; Camerer and Thaler, 1995; Güth and Kocher, 2013). We assume that the tendency toward the equal split will also feature in our unstructured bargaining game. This tendency may be less prevalent when there is private information about the pie size (e.g., Straub & Murnighem, 1995; Rapoport et al., 1996; Croson, 1996), as is the case in our experiment. In contrast, the equal split tendency is reinforced when subjects' fairness is visible to others because fairness is socially desirable (cf. Hoffman et al., 1994; Andreoni & Bernheim, 2009). Visible 'fairness' is clearly a feature in our experiment under conditions in which firm players' relative earnings in the previous period are known to the union player, namely, in the UNCORRELATED/REPUTATION and CORRELATED/REPUTATION treatment conditions. As we will show in the analyses of the data, the assumption that outcomes will tend to be equal splits of the pie is in fact strongly justified for all treatments by the observations in our experiment.

Reputation effects

The introduction of reputations by providing information about the firm players' relative earnings in the previous period affects the level of conflict in bargaining. The assumption that accepted proposals will approximate the equal split implies that firm

players' visible reputations tend to show that they have agreed to proposals that reflect approximately half of the common surplus. In this way, they are signaling that they are fair and do not use their information about the common surplus to gain disproportionately large shares. This information allows the union players to reduce their uncertainty about the type of firm player they are bargaining with provided that they interpret the firm players' fairness as stable over time. Firm players that are known to have been fair previously would be expected to be fair in the current negation and less likely to 'hide' behind proposals that are far below the equal split of the current surplus. Union players are then more likely to consider the firm player's offers to reflect the true state of the firm and more readily lower their proposals during the bargaining process. This reduces the divergence between the union and firm players' proposals.

Further reasons to expect a reduction of conflict are related to the presence of horizontal spillovers. In the UNCORRELATED treatment condition, such horizontal spillovers are driven by social comparisons and increase conflict. The introduction of firm players' reputations in the UNCORRELATED/REPUTATION treatment condition has two consequences. First, the relative salience of the reference outcomes that do not allow for any reduction of uncertainty is diminished by the availability of additional information in the form of reputation, which allows union players to reduce uncertainty about the type of firm player. Second, union players that believe that the opposing firm negotiator is fair are less likely to believe that firm players would abuse the presence of unfavorable (low) reference outcomes. Consequently, the union players are less likely to respond to such reference outcomes by raising their initial demands, which is a major source of increased divergence in the UNCORRELATED treatment condition. Hence, we expect that the introduction of information about firm players' share earned in the previous period reduces conflict when reference outcomes are uncorrelated to the value of the common surplus.

Divergence is lower in negotiations in the UNCORRELATED/REPUTATION treatment condition than in negotiations in the UNCORRELATED treatment condition. (Hypothesis 1)

In the CORRELATED treatment condition, horizontal spillovers can also result from rational learning and, as a result, do not increase conflict. Rational learning takes place because the value of the common surplus in the negotiation yielding the reference outcome is identical to the value of the common surplus in the players' own negotiation. Union players may interpret the reference outcomes as equal splits of the common surplus, thus learning its value. Lower reference outcome values imply a lower value of the common surplus and should therefore lead to lower proposals by union players. However, unions cannot ascertain whether the reference outcome really reflects an equal split of the common surplus or whether the other union actually

earned less than the equal split. Hence, some uncertainty about the value of the common surplus persists. Union players that lower their demands in response to low reference outcomes risk earning less than their 'fair share' if the firm is willing to 'hide behind' reference outcomes that are less than the equal split. When firm reputations are known, the union players are better informed about the firms' willingness to be fair. Thus, whereas we expect horizontal spillovers due to social comparisons to diminish when firm players' reputations are introduced, we expect horizontal spillovers due to rational learning to be augmented when firm players' reputations are introduced. Therefore, union players' proposals will be more closely conditioned on the reference outcome value in the CORRELATED/REPUTATION treatment condition than in the CORRELATED treatment condition, resulting in less divergence of proposals. Hence, we expect that the introduction of information about firm players' share earned in the previous period reduces conflict when reference outcomes are correlated to the value of the common surplus.

Divergence is lower in negotiations in the CORRELATED/REPUTATION treatment condition than in negotiations in the CORRELATED treatment condition. (Hypothesis 2)

So far, we have assumed that firms' reputations tend to show that they have made or accepted proposals that approximate half of the common surplus in the previous period. However, there will be some variance associated with the accepted shares. Thus, the level of 'fairness' of the firm players will vary. The higher the share, the greedier the firm players' reputation in the next period is. Conversely, the lower the share, the more fair or benevolent[43] the firm players' reputation in the next period is. We propose that firm players that are known to have agreed to higher shares of the common surplus for the union player previously will face less resistance in the form of high union proposals in the following period. Union players that believe that the firm is willing to offer them relatively large shares are expected to lower their own initial proposals and be more responsive to the initial (low) proposals of the firm. This decreases the divergence between the union players' and firm players' proposals. Hence, we expect that when the firm player's share earned in the previous period is known to the union player, lower values for this share indicate fairer firms and, all else equal, are consequently associated with less conflict.

43 Assuming that approximately even splits of the surplus are considered the fairest outcomes, shares that are higher than the even split indicate greediness (the firm player, who knows the surplus value did not make or accepted a proposals that represents an even split), while shares that are lower than the even split could be interpreted as benevolence (firm players that are willing to give more than half of the surplus to the union player) or weakness (firm players agreed to a proposals that exceeded half of the surplus for fear of not reaching an agreement otherwise). Union players cannot not distinguish between benevolence and weakness.

In the CORRELATED/REPUTATION treatment condition and the UNCORRELATED/REPUTATION treatment condition, the lower the share earned by the firm player in the previous period is, the lower divergence is. (Hypothesis 3)

Expectation effects

In all experimental conditions, the players bargain for 15 consecutive periods and know their earning in previous periods. Under the assumption that the players are loss averse, expectations effects will occur even though the value of the common surplus varies randomly in each period. In this case, earnings in one period will become reference points in the next period. These expectation effects are particularly significant for union players, who, unlike firm players, cannot readjust their preferences to match the value of the common surplus in the current period because they do not know its value. Thus, we expect that higher earnings in one period will cause union players to make higher proposals in the next period and increase their minimum acceptable proposal. Hence, all else equal, we expect that the divergence between the union players' and firm players' proposals increases and that achieving convergence of the proposals will be more difficult, resulting in more conflict in bargaining.

The higher the number of points earned by a union player, the more divergence he/she will experience during the following period. (Hypothesis 4)

3.3 Procedures

Our data collection took place in October 2012 in the NSM Decision Lab at the Radboud University Nijmegen, The Netherlands. We made use of z-Tree (Fischbacher, 2007) to program the experiment. In this study, 148 students participated in one of six experimental sessions. Each session consisted of 15 periods of interaction[44] and lasted approximately 1.5 hours, excluding the time needed to pay the participants.

All participants were randomly assigned to a cubicle when they entered the laboratory. The computer cubicles were associated with either the role of a firm (referred to as PLAYER A) or union player (referred to as PLAYER B) in the context-free experiment. In the treatment sessions, each computer cubicle was associated with

44 In the first session which served as the CONTROL treatment, the variable surplus did not take the correct value in the final period of interaction due to a software glitch. This would eradicate the perfect correlation between pie sizes of the negotiation and the reference outcome in the CORRELATED (REPUTATION) treatments. We therefore decided to exclude the final period from our analyses. For the two treatments that allow for reputations, this choice also precludes 'endgame effects' in the analyzed data.

either the UNCORRELATED (UNCORRELATED/REPUTATION) or CORRELATED (CORRELATED/REPUTATION) treatments.

All participants received written instructions for the experiment, which were read aloud by one of the experimenters at the beginning of the session. Following this, the participants were given the opportunity to ask questions for clarification. These questions were answered privately by the experimenters. After all questions were answered, the participants were asked to complete a questionnaire to ensure that all participants fully understood the rules and payoff structure of the bargaining game. These test questions were answered by all participants without difficulty. Prior to the 15 periods of interaction, 2 unpaid trial periods were used to ensure that all participants were fully acquainted with the procedure.

The participants were paid their earnings in cash immediately following the experiment. For each point earned by the participants during the experiment, they were paid 6 Euro cents. Average earnings in all experimental sessions combined, including the 3 Euro show-up fee and payment for a short pen-and-paper experiment unrelated to the present study, were 14.00 Euro (σ=1.66).

3.4 Experimental evidence

We first analyze whether the assumption that accepted proposals will approximate the equal split of the common surplus is justified. Second, we present a graphic representation of the development of union and firm proposals during the allocated bargaining time to illustrate the nature of the bargaining process in the different treatments. We then proceed to statistically test our hypotheses using multivariate analyses. The methods and specific estimated models are chosen in such a way that findings are controlled for all potentially confounding factors, particularly changes in the bargaining context and the repeated observation of the same participant.

3.4.1 Testing the equal split assumption

Table 3.3 provides descriptive statistics on the share of the common surplus represented by the accepted proposals for each experimental condition as well as for the pooled observations. These statistics strongly support the assumption that accepted shares approximate the equal split of the common surplus. We find that the modal accepted share is exactly 0.50 (50%) throughout. The mean and median shares also clearly show the equal split as the center of the distribution of accepted shares. Pooling all treatments, the interquartile range amounts to 16%, with similar distributions found in the five experimental conditions separately.

A related issue is our expectation that union players will assume that firm player types are stable, such that information about the share agreed to in the previous

Table 3.3 Accepted shares of the common surplus

	Mean	Mode (% of cases)	Median	Standard deviation	Interquartile range
All treatments	0.4873	0.5000 (18.01)	0.4677	0.1682	0.1611
CONTROL	0.4973	0.5000 (16.81)	0.4688	0.2185	0.1566
UNCORRELATED	0.4972	0.5000 (19.12)	0.5000	0.1658	0.1604
CORRELATED	0.5067	0.5000 (14.29)	0.5000	0.1619	0.1944
UNCORRELATED/ REPUTATION	0.4645	0.5000 (18.30)	0.4472	0.1469	0.1213
CORRELATED/ REPUTATION	0.4859	0.5000 (20.08)	0.5333	0.1640	0.1444

period by the firm player (i.e., its reputation) offers information about the firm player's current willingness to settle on fair outcomes. To assess to what extent this assumption is justified, we graph the evolution of shares represented by the accepted proposals for each firm player in over the 14 periods under analysis for the UNCORRELATED/

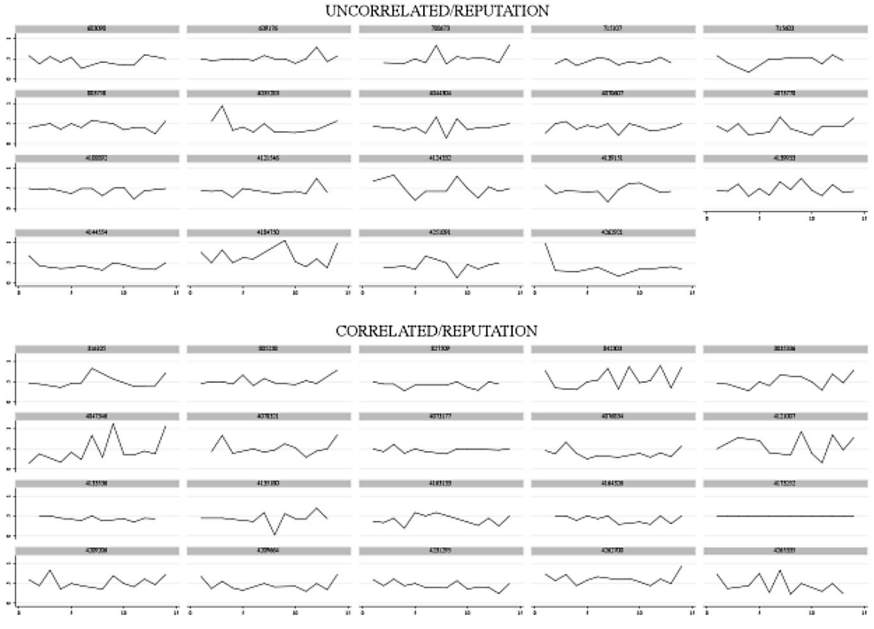

Figure 3.1 Accepted proposal as share of the common surplus over 14 periods for each firm player

REPUTATION and CORRELATED/REPUTATION treatment conditions in Figure 3.1. Although most firm players show some variation in the accepted share from period to period, there are few cases of truly erratic behavior. By and large, the accepted shares hover around the equal split throughout, with one firm player (identification number 4173252) even settling on the exactly equal split in every period. This finding suggests that union players would be justified in assuming reasonably stable firm types.

3.4.2 The bargaining process

Figure 3.2 illustrates how union and firm proposals change at the aggregate during the 60-second bargaining process in the five experimental conditions. Loess regression lines summarize the observed proposals, differentiating between union proposals (the downward-sloping lines) and firm proposals (the upward-sloping lines). To offer a fixed reference, both panels include these lines as observed in the CONTROL condition. The left-hand panel adds a depiction of the UNCORRELATED and UNCORRELATED/REPUTATION treatment conditions, whereas the right-hand

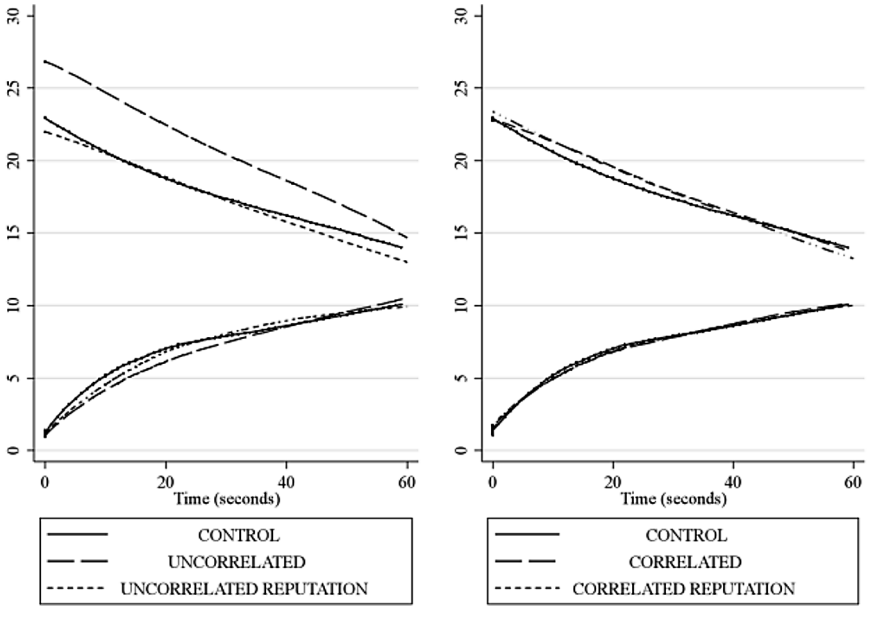

Figure 3.2 Union and firm player proposals over time, loess regression lines

panel adds a depiction of the CORRELATED and CORRELATED/REPUTATION treatment conditions.

The process of convergence during the 60-second bargaining time is clearly visible in all conditions. Union proposals start high and are gradually revised downward over time. Firm proposals start low (just over zero points) and gradually increase as the deadline draws closer. Toward the end of the bargaining time, proposals approximately converge toward a five-point range centered at approximately 12 points, the equal split of the average expected common surplus value of 24 points.

Comparing the two panels, divergence between the players' proposals increases as a result of inflated union proposals with the introduction of horizontal spillovers due to social comparisons (UNCORRELATED treatment condition) but not from horizontal spillovers that also allow for learning (CORRELATED treatment condition) (see Chapter 2). The introduction of reputation initially appears to have little impact when learning is possible, as evidenced by the similarity of the CORRELATED and CORRELATED/REPUTATION treatment conditions. However, a comparison of the UNCORRELATED and UNCORRELATED/REPUTATION treatment conditions suggests that divergence decreases substantially when reputations are introduced into an environment where horizontal spillovers arise purely from social comparisons.

3.4.3 Multivariate analyses

The unstructured bargaining design offers the important benefit of allowing the subjects to arrive at a bargaining outcome via a truly interactive decision-making process. This design more adequately reflects real-world bargaining situations than ultimatum bargaining, which is ubiquitous in experimental research but restricts 'interaction' to two and sometimes only one action. Importantly, the unstructured bargaining design reveals how the impact of spillovers on initial decisions, and consequently on initial conflict, is transformed by the process of interactive bargaining. However, this also entails that levels of conflict in the unstructured bargaining environment cannot simply be inferred from observed non-agreements (which would be referred to as 'rejections' in the ultimatum game). Rather, the analysis of conflict in unstructured bargaining must take into account that the level of conflict will differ at different points in time during the 60-second bargaining process.

Our analysis, presented in Table 3.4, therefore centers on the level of divergence between the union and firm players' proposals during different stages of the bargaining process. Divergence is measured by subtracting the current firm proposal from the current union proposal for every proposal made in a negotiation by either player. The resulting value is the difference between union demands and firm offers for every given proposal, where each proposal may have been made at any time during the bargaining process. The observed divergences are subsequently analyzed in a multivariate model. To account for the timing of the divergences within each

negotiation, we include a linear time effect[45] on the right-hand side of the equation. The coefficient of this effect can be interpreted as the estimated rate of convergence expressed as a point decrease in divergence per second.

Two problems must be addressed. First, because there are multiple observations of divergences within each negotiation (12.66 on average), they are not independent. Moreover, the negotiations themselves are not independent. Due to the observation of the same randomly re-matched subjects over multiple periods, the negotiations are cross-classified within combinations of different union and firm players. To account for these dependencies, negotiation and crossed subject-specific random effects are estimated. Furthermore, we control for the period of interaction by including a linear period effect.[46] Because the value of the common surplus randomly varies from period to period, we also control for this value by including a linear effect for the number of additional points in the negotiation. Model 1 estimates conditional average differences in divergence between the five conditions by adding a dummy variable for each treatment condition. Model 2 interacts these dummies with the bargaining time effect. This allows us to establish the rate of convergence in each experimental condition.

Under hypothesis 1, we expect that divergence will be lower in the UNCORRELATED/REPUTATION treatment condition than in the UNCORRELATED treatment condition. This hypothesis is strongly supported by our findings. The predicted average divergence at the beginning of a negotiation is much lower in the UNCORRELATED/REPUTATION treatment condition than in the UNCORRELATED treatment condition. Divergence was also hypothesized to be lower in the CORRELATED/REPUTATION treatment condition than in the CORRELATED treatment condition (hypothesis 2). We find that divergence is identical in these two conditions, offering no support for this hypothesis. Model 2 shows that although divergence is initially high in the UNCORRELATED treatment condition, the rate of convergence, represented by the marginal effect of bargaining time on divergence, is also much steeper in this treatment. This is illustrated in Figure 3.3 by the larger negative coefficient for bargaining time in the UNCORRELATED treatment condition. Thus, although there is more conflict at the beginning of the negotiations due to social comparisons in the UNCORRELATED experimental condition, which does not allow for visible firm reputations, the bargaining process 'washes out' the difference between this condition and the UNCORRELATED/REPUTATION treatment condition.

45 A linear effect yields the best fit for the observed development of divergence over bargaining time, even though Figure 2 may suggest a logarithmic transformation. The apparent discrepancy is however due to fact that number of proposals increases as the deadline approaches. This leads to a larger number of observed divergences later in the bargaining process, where the decrease of divergence is more closely represented by a linear trend.

46 The findings regarding the effects of interest are robust to alternative model specifications with period-specific fixed effects. We therefore chose to present the more parsimonious specification.

Table 3.4 Linear regression estimates of the effects on the divergence between union and firm proposals during bargaining, crossed subject-specific random effects and negotiation specific random effects (14 Periods)

	Model	
	1	2
Fixed effects	**b**	**b**
Intercept	18.517***	18.268***
	(1.379)	(1.383)
Period	-0.140***	0.139***
	(0.026)	(0.026)
Variable surplus	-0.142***	-0.142***
	(0.013)	(0.013)
Time (seconds)	-0.328***	-0.317***
	(0.002)	(0.005)
Treatment (dummy)		
CONTROL	Reference	Reference
UNCORRELATED	4.050*	5.103**
	(1.847)	(1.852)
CORRELATED	0.159	0.289
	(1.814)	(1.820)
UNCORRELATED/REPUTATION	-0.345	-0.174
	(1.169)	(1.690)
CORRELATED/REPUTATION	0.588	0.613
	(1.671)	(1.676)
Interaction		
Time*UNCORRELATED		-0.044***
		(0.007)
Time*CORRELATED		-0.006
		(0.007)
Time*UNCORRELATED/REPUTATION		-0.008
		(0.006)
Time*CORRELATED/REPUTATION		-0.002
		(0.006)
Model summary		
Wald χ^2 (df)	31520.51(7)***	31791.42(11)***
Log likelihood	-29813.066	-29779.867
N observations	11066	
N negotiations	1023	

Estimated random effects are omitted from the table and can be found in Appendix B, Table B 1.1
Standard errors in parentheses
† $p < 0.1$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; two-tailed; only reported for fixed effects

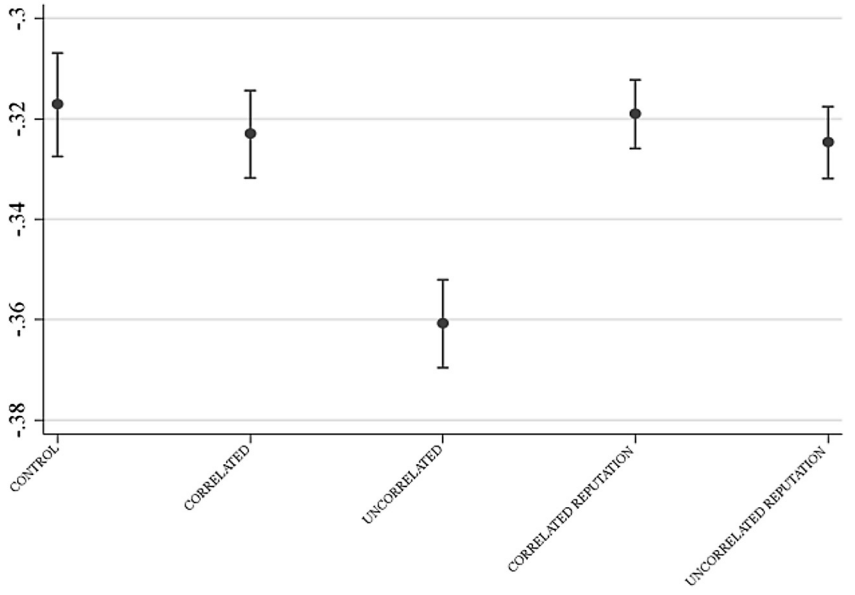

Figure 3.3 Marginal effects of bargaining time on divergence (rate of convergence per second) in five experimental conditions (95% CI)

In Table 3.5, we present estimates of the impact of the specific horizontal and vertical spillovers on divergence during the bargaining process. All treatment conditions feature horizontal spillovers in the form of reference outcomes. The effect of the value of these references outcomes is linearly modeled for the CORRELATED, CORRELATED/REPUTATION and UNCORRELATED/REPUTATION treatment conditions. In line with our previous findings (see Chapter 2), the effect is allowed to vary depending on its position relative to the initial focal point 12 in the UNCORRELATED treatment condition. This non-linearity initially manifests in the union players' opening proposals as a v-shaped relationship between the reference outcome value and the value of the opening proposal with a kink at 12 points, and carries over to the divergence during the bargaining process.[47] A dummy signifying that reference outcomes are

47 Additional statistical analyses confirmed that this non-linearity in the opening proposals only exists in the UNCORRELATED treatment condition. Hence the effect of the reference outcome value is linearly modeled in all other treatment conditions. Further analyses also indicated that, although the union players' opening proposals are not affected by the reference outcomes in the UNCORRELATED/REPUTATION treatment condition, there may be a non-linear effect on divergence. This effect would indicate that divergence decreases with increasing reference outcome values if they exceed 12 points. Absent theoretical expectations for such an effect we opt to present the linear model here in order to avoid capitalization on chance findings

non-agreements is included in all models. To account for the dynamics of spillovers with the bargaining process itself, each model interacts the modeled spillover effects with bargaining time.

For each experimental condition, we estimate the effect of the union player's earnings in the previous round (i.e., the 'expectations-effect') and the firm's share of the common surplus earned in the previous period (i.e., the 'reputations-effect'). A dummy variable controls for non-agreements in both cases. The effect of the share of the common surplus earned by the firm player in the previous period is estimated in all conditions to prevent the attribution of potentially spurious effects to the impact of reputation. The control variables are identical to those included in Table 2.4. For ease of interpretation, the evolution of the marginal effects of all spillovers during the bargaining process is graphically represented in Figure 3.4 – Figure 3.6.

Hypothesis 3 predicts that in the UNCORRELATED/REPUTATION treatment condition and the CORRELATED/REPUTATION treatment condition, the lower the share earned by the firm player in the previous period, the lower divergence will be. The results, illustrated in Figure 3.4, support this hypothesis, but only for the UNCORRELATED/REPUTATION treatment condition. Strikingly, the impact of reputation in this treatment only manifests in the second half of the bargaining process, with increasingly greedy firms facing increasingly high levels of divergence.

We hypothesized that high union expectations would increase conflict, resulting in an increase in divergence with higher union player earnings in the previous period (hypothesis 4). Our analyses, illustrated in Figure 3.5, suggest that absent any other spillovers in the CONTROL condition, this is indeed the case. However, the initial increase in divergence is transformed by the bargaining process, even to the point of the effect changing signs as the deadline approaches. The introduction of horizontal spillovers in the UNCORRELATED and CORRELATED treatment conditions prevents any impact of union expectations on divergence. However, when firm reputations are also present, the effect re-emerges. Especially in the CORRELATED/REPUTATION treatment condition, high union expectations have a lasting escalating impact on the bargaining process.

Table 3.5 Linear regression estimates of the effects on the divergence between union and firm proposals during bargaining, crossed subject-specific random effects and negotiation specific random effects (13 Periods)

	CONTROL	UNCORRELATED	UNCORRELATED/ REPUTATION	CORRELATED	CORRELATED/ REPUTATION
Fixed effects	**b**	**b**	**B**	**b**	**b**
Intercept	16.865***	29.794***	13.191***	16.841***	14.510***
	(2.794)	(3.228)	(1.891)	(2.708)	(1.732)
Time (seconds)	-0.178***	-0.459***	-0.299***	-0.257***	-0.322***
	(0.030)	(0.039)	(0.027)	(0.035)	(0.024)
Period	-0.004	-0.114	0.258***	0.161*	0.108*
	(0.076)	(0.086)	(0.056)	(0.073)	(0.045)
Variable surplus	-0.172***	-0.134**	-0.149***	-0.149***	-0.119***
	(0.040)	(0.044)	(0.030)	(0.040)	(0.025)
Reference outcome = no agreement (dummy)		-3.038	1.567†	3.025*	2.263**
		(1.977)	(0.943)	(1.346)	(0.829)
Reference outcome		-0.506*	0.156*	0.274**	0.225***
		(0.200)	(0.067)	(0.098)	(0.069)
Reference outcome > 12 (dummy)		-5.896			
		(6.225)			
Union points earned in previous period	0.304**	0.059	0.196*	-0.073	0.251***
	(0.102)	(0.098)	(0.089)	(0.088)	(0.069)
Union no agreement in previous period (dummy)	3.626*	2.200	1.116	-0.441	4.183***
	(1.153)	(1.613)	(1.329)	(1.410)	(1.010)
Firm share earned in previous period	-1.598	-1.299	0.793	-0.837	-1.643
	(2.690)	(2.545)	(1.922)	(2.426)	(1.500)
Firm no agreement in previous period (dummy)	-1.725	-3.620*	-0.749	-1.862	-1.964*
	(1.615)	(1.527)	(1.223)	(1.559)	(0.943)

Interactions					
Reference outcome*Reference outcome > 12 (dummy)		0.582			
		(0.410)			
Time*Reference outcome = no agreement (dummy)		0.051†	-0.047**	-0.056**	-0.003
		(0.028)	(0.014)	(0.021)	(0.014)
Time*Reference outcome		0.009**	-0.003**	-0.005***	-0.001
		(0.003)	(0.001)	(0.002)	(0.001)
Time*Reference outcome > 12 (dummy)		0.279**			
		(0.103)			
Time*Reference outcome*Reference outcome > 12 (dummy)		-0.022**			
		(0.006)			
Time*Union points earned in previous period	-0.011***	0.001	-0.004**	-0.001	-0.002†
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Time*Union no agreement in previous period (dummy)	-0.180***	-0.053*	-0.024	-0.024	-0.058***
	(0.027)	(0.022)	(0.018)	(0.036)	(0.017)
Time*Firm share earned in previous period	-0.002	0.037	0.090**	0.010	0.077**
	(0.042)	(0.036)	(0.030)	(0.036)	(0.024)
Time*Firm no agreement in previous period (dummy)	0.019	-0.053*	0.069***	0.027	0.046**
	(0.027)	(0.023)	(0.020)	(0.024)	(0.016)
Model summary					
Wald χ^2 (df)	3605.38(11)***	5882.02(19)***	8395.71(15)***	4411.55(15)***	9480.92(15)***
Log likelihood	-3514.593	-4829.557	-7234.718	-5165.192	-7327.325
N observations	1311	1770	2740	1873	2822
N negotiations	128	155	241	168	259

Estimated random effects are omitted from the table and can be found in Appendix B, Table B 1.2
Standard errors in parentheses
† $p < 0.1$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; two-tailed; only reported for fixed effects

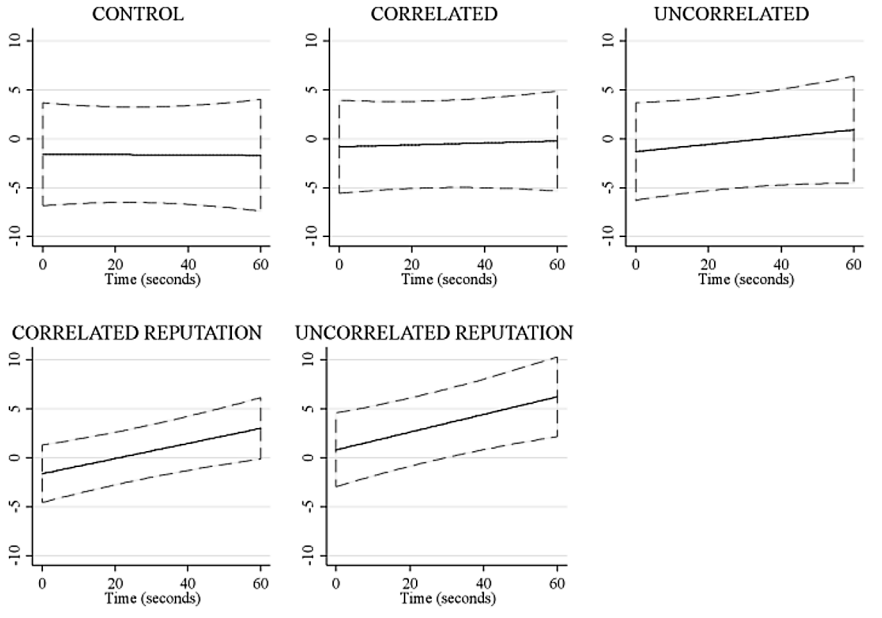

Figure 3.4 Average marginal effects of the share earned by the firm player in the previous period on divergence during the bargaining process (95% CI)

Our reasoning for the existence of conflict-decreasing effects of reputations is partly based on the expectation that reputations alter the impact of horizontal spillovers. Specifically, we argue that social comparisons diminish and are less likely to lead to escalating union player demands when the reference outcome is unfavorable, whereas rational learning is augmented. We find support for both of these arguments. The impact of horizontal spillovers on divergence changes with the introduction of firm reputations, as seen in Figure 3.6. Comparing the UNCORRELATED treatment condition with the UNCORRELATED/REPUTATION treatment condition, we find that the escalating effects of reference outcomes that are increasingly unfavorable to the union (=<12 points) are indeed prevented in the UNCORRELATED/REPUTATION treatment condition. Moreover, although the effect of horizontal spillovers is very similar in the CORRELATED and CORRELATED/REPUTATION treatment conditions in terms of effect size, this effect is much less diminished during the bargaining process in the CORRELATED/REPUTATION treatment condition.

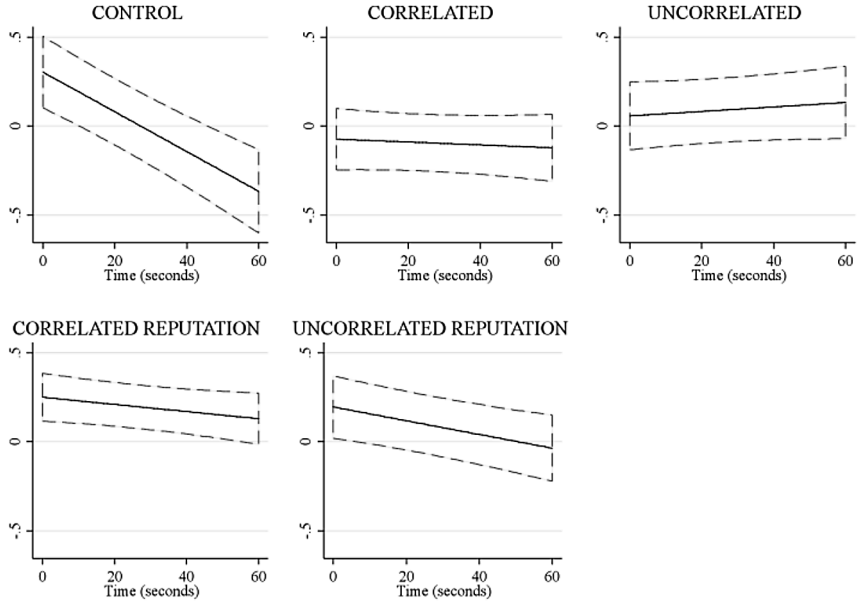

Figure 3.5 Average marginal effects of the points earned by the union player in the previous period on divergence during the bargaining process (95% CI)

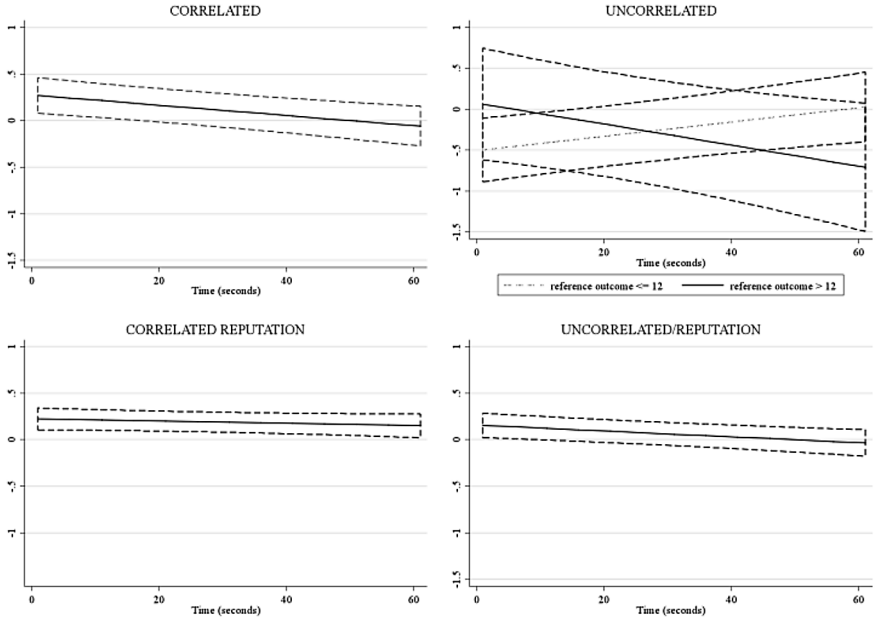

Figure 3.6 Average marginal effects of the value of reference outcome on divergence during the bargaining process (95% CI)

Table 3.6 Summary of findings

Hypothesis		Findings
1	Divergence is lower in negotiations in the UNCORRELATED/ REPUTATION treatment condition than in negotiations in the UNCORRELATED treatment condition.	Supported
2	Divergence is lower in negotiations in the CORRELATED/ REPUTATION treatment condition than in negotiations in the CORRELATED treatment condition.	Refuted
3	In the CORRELATED/REPUTATION treatment condition and UNCORRELATED/REPUTATION treatment condition, the lower the share earned by the firm player in the previous period is, the lower divergence is.	Partially supported (only in the UNCORRELATED/REPUTATION treatment condition)
4	The higher the number of points earned by a union player, the more divergence he/she will experience during the following period.	Partially supported (effect is present in CORRELATED/REPUTATION treatment condition; effect is also present in the CONTROL condition early in the bargaining process but changes direction later in the bargaining process)

3.5 Conclusion

In this study, we investigated the impact of spillovers on conflict in bargaining. The theoretical framework developed in our study distinguishes between two sources of spillover: information about other bargaining units (horizontal spillovers) and information about the past of the bargaining unit (vertical spillovers). The framework also distinguishes between two fundamental theoretical assumptions about the causes of spillovers. One states that spillovers occur because they allow for a reduction of uncertainty about private information, leading to rational learning as a mechanism for horizontal spillovers and reputation effects as a mechanism for vertical spillovers. The other states that spillovers occur due to reference-dependent preferences, leading to social comparisons as a mechanism for horizontal spillovers and expectation effects as a mechanism for vertical spillovers. We study the impact of reputation and expectation effects on conflict in bargaining in an environment that allows for horizontal and vertical spillovers. Four hypotheses were tested using a two-person, asymmetric information, unstructured bargaining experiment. Table 3.6 presents an overview of our findings.

Our analysis offers two general insights. First, spillovers that allow for a reduction of uncertainty about private information tend to decrease conflict in bargaining, whereas spillovers that result from reference-dependent preferences tend to increase conflict in bargaining. Second, different sources and different mechanisms of spillovers can interact and may strengthen or weaken each other.

The findings suggests that allowing firms to build reputations by offering unions information about the fairness of firms' past bargaining behaviors decreases conflict in bargaining when horizontal spillovers arise exclusively from social comparisons. Two complementary processes explain this finding. First, 'good reputations', evidenced by firms offering or agreeing to larger shares for unions in the past, help to reduce conflict in current negotiations, whereas more 'greedy' firms face more conflict. Second, when firm reputations are known, the impact of horizontal spillovers resulting from social comparisons is altered. Without knowledge about a firm's past, unions anticipate the firm's potentially self-serving use of reference outcomes and respond to unfavorable reference outcomes with escalating demands (see Chapter 2). Knowing that the firm is fair based on its reputation prevents such escalation. We find that knowledge about the fairness of firms' past bargaining behavior does not decrease conflict in bargaining where horizontal spillovers can be caused by rational learning. However, the evidence suggests that firms' reputation may augment the impact of rational learning by decreasing the risk of concession making for the union players. Furthermore, we find that the unions' expectations based on their previous bargaining outcomes under some conditions affect bargaining, with high expectations leading to more conflict. Somewhat surprisingly, these expectation effects are

particularly pronounced when the firms' past behavior (i.e., their reputations) is known. A potential explanation for this finding is that horizontal spillovers by themselves shift the union's focus to the present, whereas information about the firm's reputation, and therefore its past, makes the union's own past a salient reference point again.

In short, our study suggests that the past can play an important role in wage bargaining conflicts. Managing reputations and expectations can have direct influences and can affect how bargaining units respond to information about what happens in other bargaining units.

A number of limitations of this study should be addressed in further research. First, we only investigated union expectation-driven vertical spillovers based on the assumption that a firm would be less susceptible to expectations due to its knowledge of its ability to pay. The validity of this assumption deserves further scrutiny. Second, we only investigated firm reputation-driven vertical spillovers based on past fairness. Future studies should also investigate union reputations and reputations based on either side's willingness to engage in conflict.

4

The Influence of External Information on Collective Bargaining: Survey Evidence of Union and Firm Negotiators in the Netherlands[48]

48 A slightly different version of this chapter has been published in *Relations Industrielles/Industrial Relations* (Lehr, Akkerman & Torenvlied, 2015). An earlier version of this chapter was presented at the IFSAM conference, Limerick, Ireland, June 2012.

Abstract

External information is generally assumed to greatly affect collective bargaining, yet rigorous empirical investigations of the influence of this information on union and firm negotiators are surprisingly scarce. Comprehensive standardized survey data measuring the influence of external information on negotiators in the Netherlands were analyzed to reveal the extent to which negotiators were influenced by different types of external information and how differences in these influences could be explained by the characteristics of negotiators and bargaining units. The findings indicate that the influence of external information a) increased with proximity of the information source, b) was usually greater for union negotiators than for firm negotiators; and in some cases c) modestly increased with negotiator experience and d) was greater in company bargaining than in sector bargaining.

4.1 Introduction

Theories explaining the outcomes of and conflicts in labour contract negotiations commonly model the behaviour of actors that have the power to take decisions at the bargaining table, i.e., the negotiators, as a function of their knowledge and evaluation of various types of information (e.g., Walton and McKersie, 1965, pp. 44, 61-63; Dunlop, 1957). Such information may either be internal (characteristics of the bargaining event itself), or external (contextual characteristics of the bargaining event) (c.f. Blanchflower and Oswald, 1988; Abowd, 1989). Despite the central role attributed to the influence of information on negotiators, rigorous empirical analyses of this influence are scarce. Many studies instead rely on anecdotal evidence or opt to simply build on a priori assumed influences. To the extent that direct empirical evidence of the influence of information on negotiators does exist, it is usually limited to one side of the bargaining table, ignoring that bargaining is a *joint* decision-making process. In this paper, we present a systematic study of the influence of different types of external information on union and firm negotiators in collective bargaining in the Netherlands, and offer explanations for the variation in this influence.

Our first goal was to answer the following question: *to what extent are negotiators in collective bargaining influenced by different types of external information?*

We developed a questionnaire survey measuring self-reported influences of different types of external information on union and firm negotiators. A particular strength of our survey is that it offers an extensive, standardized analysis of the direct impact of spillovers from the past and from other bargaining units on negotiators, circumventing identification problems associated with establishing such effects (c.f. Mitchell, 1982; Heckman, 1991; Manski, 1993).

The extent to which external information affects bargaining behavior is likely to vary across different types of negotiators, different types of bargaining units and different types of information (c.f. Ashenfelter and Johnson, 1969, Mauro, 1982; Cousineau and Lacroix, 1986), The second goal of our study was therefore to shed light on a second question: to *what extent can differences in the influence of external information between negotiators be explained by the characteristics of the negotiators, bargaining units and the type of information?*

To our knowledge, this is the first comprehensive quantitative analysis of variations in the influence of external information on negotiators in collective bargaining.

4.2 Theory and hypotheses

Bargaining theory typically assumes that negotiators do not have complete information on critical aspects of the bargaining event they are involved in. In collective bargaining, these critical aspects are bargaining power (Leap and Grigsby, 1986; Svejnar, 1986; Cousineau and Lacroix, 1986; Martin, 1992), employers' ability to pay (Hayes, 1984; Cramton and Tracy, 2003) and norms concerning fair outcomes (Hyman and Brough, 1975; Frank, 1984; Rees, 1993). As negotiators aim to overcome their uncertainty regarding such aspects, they turn to external information that may serve as a proxy. We distinguish four types of external information: 1) economic information, 2) information on organizational power, 3) institutional information, and 4) information spillovers.

In the following section, we explain our selection of the types of external information in our analysis, based on common assumptions and findings of labor relations research. Because we aim to provide standardized measurements, this selection is by necessity not exhaustive and we recognize that other relevant indicators may be suggested. Following the presentation of the chosen types of external information, we develop testable hypotheses concerning the influence of external information from extant theory, common assumptions and empirical findings.

4.2.1 Types of external information

Empirical studies consistently find a relationship between economic factors and collective bargaining outcomes and conflicts, as bargaining strategies are shaped by negotiators' perceptions of these factors. The economic indicators most commonly found to affect collective bargaining are prices and employment (Franzosi, 1989; Card, 1990; Kaufman, 2002; Cramton and Tracy, 2003). Therefore, we investigated the influence of information on employment and pricing developments on negotiators. We distinguished between different levels at which these developments operate and analyzed those that were most pertinent for each type of factor within our empirical context. For employment, this entailed differentiating between national, sectoral and local developments. For pricing, we focused on international, national and sectoral developments.

Organizational power also substantially affects collective bargaining (Franzosi, 1989; c.f. Shorter and Tilly, 1974). At the macro level, unionization is the primary factor of interest, as it reveals crucial information on unions' ability to mount collective action. However, as we were concerned with factors that affect the behavior of

individual negotiators, there may be more informative indicators of power.[49] The first indicator we considered was militancy, defined as the readiness of employees to partake in industrial action.[50] If employees are more willing to partake in industrial action, the ability of a union to inflict costs upon the firm through strike action will increase, giving them relatively more leverage. Similarly, strike funds determine the power of the union vis-à-vis the firm (Clegg, 1976; Skeels and McGrath, 1997). Public opinion can also influence bargaining power, as the public's reaction to a firm's behavior during collective bargaining may hurt sales while unions may depend on public support to mobilize workers (Chamberlain and Kuhn, 1986: 189-191). We therefore studied the influence of information on three organizational power factors: a) workers' readiness for industrial action, b) union strike funds and c) public opinion.

The third type of external information we considered was related to institutional factors. Here, it was important to consider the specifics of the Dutch case. In the Netherlands, collective bargaining occurs at both the company and sector level, with the sector level being dominant and sector level contracts sometimes setting a framework for company level bargaining (EIRO, 2008). Moreover, collective bargaining is multileveled, as central agreements of labor and employer peak organizations provide a non-legally binding benchmark for both company and sector level agreements (Akkerman and Torenvlied, 2002). Through ILO conventions, the European Social Charter, and a more general trend towards Europeanization of employment relations (Brandl and Traxler, 2009; EUROFOUND, 2012), collective bargaining is also affected by international developments. Given this complex context, we chose the focus our analyses of external information on developments related to collective agreements on five levels: a) international, b) national, c) sectoral, d) local, and e) comparable companies.

External information related to collective agreement developments may not only reflect institutional aspects. Although pattern bargaining, i.e., reiterated, long-term stable and explicit co-ordination (c.f. Traxler et al., 2008) does not feature prominently in the Netherlands (Van Rij and Rojer, 1998), different collective agreements are not independent of each other. Information on other bargaining events affects negotiators through spillovers. Traditionally, spillovers have been associated with the influence of

49 In the Netherlands, union density is comparatively low, yet collective agreement coverage is high. The consequences of bargaining thus extend beyond union members (Hartog, Leuven and Teulings, 2002). Moreover, in the case of industrial action, participation is not limited to union members. In fact, it may be used as a tool to attract new members (Akkerman, 2008). The readiness of employees to participate may therefore be considered a better indicator of bargaining power than unionization.

50 Information on militancy may be considered internal rather than external. We chose to include it nevertheless. In contrast to the other factors we analyzed, this factor was not by definition contextual but was also an attribute of the bargaining unit. Presumably, the militancy of the employees within a bargaining unit is likely to be considered of more importance than that of employees elsewhere.

specific information on bargaining outcomes, i.e., wages, *across* different bargaining units (e.g., Christofides et al. 1980; Babcock et al., 2005). However, spillovers may also occur over time *within* bargaining units, for instance, because past settlements affect future settlements directly, leading to history-dependence (Card, 1990, Bewley, 1999). Moreover, spillovers across and within bargaining units are not limited to outcomes. Negotiators also take into account information on conflicts and conflict potential (e.g., Mauro, 1982; Schnell and Gramm, 1987; Campolieti et al., 2005; Kuhn and Gu, 1999). We investigated this complex array of spillovers by measuring the influence of information on: a) outcomes, b) employees' readiness for industrial action and c) the success of industrial action. We differentiated each of these types of informational content according to the following three potential sources: a) the same bargaining unit in the past, b) other bargaining units in the same sector and c) other sectors.

4.2.2 Spillovers and proximity

Spillovers from different sources are likely to have different relevance. Wage spillovers have traditionally been considered to be a phenomenon that occurs within sectors. The implicit argument is that for spillovers to occur, information must be sufficiently relevant. For instance, spillovers driven by social comparisons (e.g., Babcock et al, 2005) arise because workers take the wages of workers in other bargaining units as relevant reference points (c.f. Tversky and Kahneman, 1981) if these other workers closely resemble themselves (c.f. Festinger, 1954). Alternatively, spillovers may also be driven by a process of rational learning (Kuhn and Gu, 1999), which can only occur if the outcomes and conflicts of bargaining in one bargaining unit reveal private information in other bargaining units because this information is correlated within sectors. Spillovers within sectors may thus be expected to have more influence than spillovers across sectors. However, the most important reference point for current wages are past wages within the bargaining unit (Bewley, 1999). Similarly, past conflict (potential) in a bargaining unit is presumably the best indicator for future potential outcomes of conflict. Ordering sources of spillovers by their proximity to the current bargaining event, we expected that *information on the past experience of the bargaining unit would have the most influence on negotiators, followed by information on the past experience of other bargaining units within the same sector, while information on the past experience of other sectors would have the least influence* (Hypothesis 1).

4.2.3 Union and firm negotiators

A common assumption in bargaining theory is that one bargaining party will have better information than the other, i.e., information is asymmetric. Asymmetric information models became a standard solution to the Hicks (1932) bargaining

paradox in the 1980s, and remain highly influential. Bargaining is thought of as the division of an economic surplus between the firm(s) and workers represented by their union(s) (Cramton and Tracy, 2003). The critical aspect of the bargaining event is the firm's ability to pay, which is commonly assumed to be known to firms but can only be estimated by unions (Hayes, 1984). Alternatively, it has been argued that it is actually the employer's willingness rather than ability to pay that characterizes wage bargaining (Bewley, 1999). Regardless of this distinction, unions are generally thought of as being at an informational disadvantage.

Moreover, through their actions in the bargaining process, negotiators reveal information on their willingness to concede. In practice, trade unions formulate a demand that firms can respond to by acceptance or a counteroffer. This allows firms to learn about the union's willingness to concede before revealing their own, adding to the uncertainty that unions face relative to the uncertainty that firms face. Therefore, the need to reduce uncertainty by using external information should be higher among union negotiators than among firm negotiators and we expected that *external information would have more influence on union negotiators than on firm negotiators* (Hypothesis 2).

4.2.4 Experience

There are two different possible accounts of the relationship between negotiator experience and the influence of external information. Montgomery and Benedict (1989) argue that more experienced negotiators are less likely to experience strikes because experienced negotiators are better able to ascertain the true value of the unobservable aspects critical to reaching an agreement. Similarly, Reder and Neuman (1980) propose that bargaining units consisting of more experienced negotiators are less likely to strike because negotiators learn to anticipate each other's behavior. It may therefore be argued that experience reduces negotiators' uncertainty, which in turn limits their need for external information. This leads us to the following hypothesis: *the more experience negotiators have, the less they are influenced by external information* (Hypothesis 3a).

However, it is equally plausible to argue the reverse. Reder and Neuman (1980) maintain that in bargaining units that bargain repeatedly, negotiators learn from past bargaining events. This may be interpreted as spillovers within the bargaining unit over time. Anecdotally, Rees (1993) illustrates how, through his repeated personal involvement in wage setting, he became aware of the importance of external wage comparisons. More generally, it may be argued that, as negotiators become more experienced, they learn to use external information and consequently face less uncertainty. We therefore propose the alternative hypothesis that *the more experience negotiators have, the more they are influenced by external information* (Hypothesis 3b).

4.2.5 Bargaining level

In the Netherlands, there is a mix of single and multi-employer bargaining. Following Olson's (1982) idea that organized interest is most disruptive to society when it is strong enough to have considerable impact without being so encompassing that it substantially bears the costs it creates, Calmfors and Driffhill (1988) argue that there is a hump-shaped relationship between the level of bargaining centralization and economic performance. Their theory yields predictions for comparisons of different industrial relations systems, however, it may also yield propositions for within-country comparisons. Calmfors and Driffhill argue that that decentralized, i.e. company level bargaining, is largely subject to market forces, while intermediate levels of centralization, i.e. sector level bargaining, can operate in relative independence from its economic environment. Assuming perfect product-market competition, a single company in isolation cannot raise wages without incurring decreased competitiveness and employment. Sector-level bargaining, on the other hand, allows negotiators to pass on negative externalities because they can jointly raise prices. We may thus expect that, compared to company-level bargaining, sector-level bargaining is primarily concerned with developments within the sector and takes place under relative autonomy from its economic environment. Therefore, we tested the hypothesis that *information on international, national and local economic developments will have less influence on negotiators in sector agreements than on negotiators in company agreements* (Hypothesis 4).

Sector-level bargaining is dominant in the Netherlands and sector agreements often set the framework for company level bargaining. Moreover, company bargaining is prevalent in particular branches and regions, such as transport and storage in the Rotterdam harbor. This induces direct labor-market competition among these bargaining units as well as a high level of interdependence of organizationally derived bargaining power, e.g., correlated militancy and strike funds. Hence we expected that *local collective agreement developments, collective agreement developments in comparable companies and spillovers across bargaining units would have more influence on negotiators in company agreements than on negotiators in sector agreements* (Hypothesis 5).

4.3 The empirical context

The Netherlands features state-sponsored coordination (Traxler, 2003) with bipartite and tripartite consultation. Non-binding central agreements that serve as benchmarks for lower level bargaining (Akkerman and Torenvlied, 2002) are negotiated in the bipartite Labour Foundation (Stiching van de Arbeid). Tripartite processes take place in the Social Economic Council (Sociaal Economische Raad), which advises on general social economic decisions (EIRO, 2008).

Approximately 1000 collective agreements are in effect and roughly one fifth of these are sector agreements. Approximately 84 percent of the labour force is covered by a collective agreement (EIRO, 2008), four fifths of which through sector agreements. In some sectors, there are both company and sector level agreements. High collective bargaining coverage is maintained despite the trade union density being comparatively low at approximately 24% (EIRO, 2008) because collective agreements apply to both unionized and non-unionized workers in a workplace and because the extension of collective agreements to whole sectors is common (c.f. Rojer, 2002). The three major Dutch trade union federations are divided by religion, ideology and occupational status. Collective bargaining often involves more than one union (Akkerman, 2000).

Overt industrial conflict in the Netherlands is rare. According to official statistics, between 2005 and 2011 there were between 17 and 31 strikes annually, only about half of which were the result of conflicts in collective bargaining (CBS, 2012). The number of working days lost in this period was generally lower than that in most other European countries, peaking at 120.600 in 2008 and dropping as low as 4.600 in 2009 (Ibid, 2012). However, compared to other countries, industrial action in the Netherlands is often prevented by court rulings, which frequently appeal to potential harm to third-party interests (EIRO, 2002; EUROFOUND, 2012).

4.4 Data and measurements

4.4.1 Sample

We gathered questionnaire survey data among negotiators involved in collective bargaining in the Netherlands (2011 Dutch Negotiator Survey). The data collection took place between October 2011 and January 2012. One hundred and fifty (150) collective agreements were selected via randomization from all existing Dutch collective agreements. The sampling frame was limited to agreements with starting dates from 1 January 2009 to 1 April 2011. This interval was chosen to minimize the risk of introducing retrospective bias while simultaneously minimizing the risk of selecting agreements for which negotiations were still in progress.[51]

We used all available documents related to the selected collective agreements to compile a list of contact data for the negotiators involved in the collective agreements. This initial list comprised 302 negotiators, who were invited via email to fill out an online questionnaire. For negotiators who had been involved in more than one of the

51 Holdouts, i.e. continued negotiation over a new agreement after the old agreement has expired, are common in the Netherlands. During holdouts, the old agreement remains intact, while the eventual new agreement is usually backdated to coincide with the end date of the old agreement (c.f. Ours and Wijngaert, 1996).

selected collective agreements, we asked for information on only one of these agreements. A snowball question was included, asking for the names and contact information of the five most important other negotiators involved in bargaining for the agreement. These negotiators were subsequently also invited to participate. Combining these sampling methods, we were able to ask 409 negotiators to participate in our study, of which 58.1% were union representatives and 41.9% were firm representatives. 123 negotiators representing 73 of the 150 agreements completed the questionnaire.[52] The distribution of union and firm negotiators and the representation of company and sector agreements in this sample were highly comparable to the sampling frame, and there were no indications of other sources of non-response bias.

4.4.2 Measures

External information

We set out to investigate the influence on negotiators of information on economic, organizational power and institutional indicators, as well as the influence of spillovers. To this end, we created two sets of items in our questionnaire.

As for the first set of items, we asked respondents whether the following types of information influenced them in general during collective bargaining: (1) 'national employment levels,' (2) 'local employment levels,' (3) 'employment in the relevant sector,' (4) 'international pricing developments,' (5) 'national pricing developments,' (6) 'pricing developments in the relevant sector,' (7) 'international collective agreement developments,' (8) 'national collective agreement developments,' (9) 'collective agreement developments in the relevant sector,' (10) 'collective agreement developments in comparable companies,' (11) 'local collective agreement developments,' (12) 'employees' readiness for industrial action,' (13) 'union strike funds' and (14) 'public opinion.' When the response was positive, we asked the negotiators to rate how important that type of information was to them in general during collective bargaining, on a scale of '1' = 'not very important' to '5' = 'very important.' We then recoded each of these issues into a variable with a six-point scale, where '0' represented 'not mentioned as an influence,' '1' represented 'mentioned but not very important,' and the maximum value of '5' represented 'mentioned and very important.'

The second set of items specifically examined the influence of information spillovers from other bargaining events. We asked the respondents to rate how strongly they agreed with nine statements. Three statements referred to information on the outcomes of other bargaining events. The other six items referred to information on conflict, divided into: a) the readiness for industrial action and b) the success of

52 Two negotiators were involved in a public sector agreement. As a robustness check, all findings reported here were replicated with these negotiators excluded from the sample.

industrial action. Furthermore, we differentiated each type of information according to three different possible sources: a) the past experience of the bargaining unit, b) that of other companies in the same sector and c) that of other sectors. This yielded nine unique statements (see Table 4.1) for the measurement of spillovers, with possible answers ranging from '1'= 'not at all' to '5'= 'very much.'

Table 4.1 Overview of Measurements of the Influence of Information on Other Bargaining Events

In general, during collective bargaining, I am influenced by information on…
Outcomes for the same collective agreement in the past
Outcomes for collective agreements in other companies in the same sector
Outcomes for collective agreements in other sectors
Past readiness for industrial action of the employees covered by the collective agreement
Readiness for industrial action of employees in other companies in the same sector
Readiness for industrial action of employees in other sectors
The success of industrial action for the same collective agreement in the past
The success of industrial action in other companies in the same sector
The success of industrial action in other sectors

Independent variables

To test for differences between union and firm negotiators in the reported influence of external information, we created a variable with dummy coding for 'union negotiator' (reference 'firm negotiator'). To measure experience, for each negotiator, we calculated the number of years that he or she was active in collective bargaining. As we asked the negotiators to report the influence that various types of external information had on them in general during collective bargaining, the measurement of bargaining unit characteristics was less straightforward. Negotiators in the Netherlands, especially union representatives, are often professionals who negotiate multiple collective agreements. We used the characteristics of the collective agreement for which the negotiators were selected into the sample as proxies and created a dummy variable for sector agreements, with company agreements as the reference category. This was based on the assumptions that negotiators will generally bargain for similar types of collective agreements.

Control variables

Little is known about possibly confounding factors that may affect the analysis of the influence of external information on negotiators. We proposed four, namely, age, gender, coverage of the agreement and the economic sector. Age is presumably positively associated with experience. Therefore, a tests of the relationship between experience and the influence of external information should control for potential life-cycle or cohort effects. Research suggests that there are gender differences in information processing (e.g., Graham, Myers and Stendardi, 2010). Consequently, we controlled our findings using a dummy variable for 'female' (reference 'male'). Because sector agreements generally cover a greater number of workers than company agreements, we also controlled for coverage using a variable that counted the number of workers to which the agreement applied. To account for different economic contexts, we included a categorical economic sector control with four categories; 'primary,' 'secondary' (reference), 'tertiary' and 'quarternary.'

4.5 Analyses

4.5.1 Descriptive statistics

Characteristics of the collective agreements and the negotiators

The 123 negotiators included in our sample represented 73 unique collective agreements. 53 (72.6%) of these were company agreements, while 20 (27.4%) were sector agreements. The distribution of the number of employees covered by these agreements was right skewed, with the first three quartiles consisting of agreements covering fewer than 5000 employees, while the largest agreements covered several hundred thousand employees. The median number of employees covered was 820. Table 4.2 presents the descriptive statistics on the negotiators. 62% of the respondents were union negotiators, which does not deviate significantly from the proportion of union negotiators invited to participate. One fifth of the negotiators were female. The mean age was approximately 50 and on average the negotiators had 13 years experience with collective bargaining. One third of the negotiators were selected through a sector agreement. The median coverage of the agreements across the individual negotiators was 1500 employees.

The influence of economic, organizational power, and institutional information

Table 4.3 presents the descriptive statistics on the reported influence of information on employment developments, pricing developments and collective agreement developments on various levels, as well as the reported influence of information on militancy, strike funds and public opinion.

Table 4.2 Descriptive Statistics on the Respondents

	Valid N	Min.	Max.	Mean	Standard deviation
Negotiator's age	123	27	65	49.69	8.24
Negotiator's gender female	123	0	1	0.20	
(ref. male)					
Union negotiator	123	0.00	1.00	0.62	
(ref. firm negotiator)					
Negotiator's experience	123	2.00	32.00	12.91	7.50
Sector agreement	123	0	1	0.33	
(ref. company agreement)					
Coverage	123	18	819500	17892.20	77157.53
Economic sector (ref. secondary)					
Primary	123	0	1	0.08	
Tertiary	123	0	1	0.41	
Quarernary	123	0	1	0.07	

Source: 2011 Dutch Negotiator Survey.

Regarding employment information, the highest mean was found for the influence of information on employment levels in the relevant sector. Lower values were found for information on national or local employment. We also found relatively high averages for the influence of information on national and sector pricing developments, especially compared to international pricing developments. These findings suggest that, besides being the dominant bargaining level, sector level economic developments were also the most important economic external influence on collective bargaining.

Organizational power indicators influenced the negotiators less than the economic indicators. Information on militancy was moderately influential while information on union strike funds and public opinion had a very limited influence. The comparatively low impact of organizational power indicators may be explained by the low levels of overt industrial conflict in the Netherlands, which limits the strategic value of such information.

National and sectoral collective agreement developments were highly influential, clearly reflecting both the multileveled nature of bargaining as well as the importance of sector agreements. In the context of increasing Europeanization and the openness of the Dutch economy, international collective agreement developments may be

Table 4.3 Reported Influence of Economic, Organizational and Institutional Information

	Valid N	Min.	Max.	Mean	Standard deviation
Employment developments					
National	123	0	5	2.20	1.63
Sector	123	0	5	3.39	1.56
Local	123	0	5	2.03	1.68
Pricing developments					
International	123	0	5	1.84	1.62
National	123	0	5	3.02	1.70
Sector	123	0	5	3.14	1.74
Organizational indicators					
Militancy	123	0	5	2.52	1.78
Strike funds	123	0	5	1.07	1.19
Public opinion	123	0	5	1.56	1.43
Collective agreement developments					
International	123	0	5	1.41	1.41
National	123	0	5	3.66	1.15
Sector	123	0	5	3.64	1.37
Local	123	0	5	1.88	1.77
Comparable companies	123	0	5	3.34	1.71

Source: 2011 Dutch Negotiator Survey.

expected to play a significant role. Indeed, 63.41% of the negotiators reported that they were influenced by them. However, they were on average rated to be considerably less influential than national and sectoral developments. Local developments were also reported to have a rather modest influence, which suggests that, possibly related to the small country size, no substantial geographical dynamics were at play in the collective bargaining. However, we did find a very high mean value for the influence of information on collective agreement developments in other, comparable companies. Despite the lack of formal pace-setting, this suggests that there was a substantial amount of spillovers across different bargaining units. A more detailed analysis of what these spillovers entailed is presented in the next section.

The influence of spillovers

We measured the influence of spillovers containing information on: 1) outcomes, 2) the readiness of employees for industrial action and 3) the success of industrial

Table 4.4 Reported Influence of Spillovers from Other Bargaining Events

	Valid N	Min.	Max.	Mean	Standard deviation
Outcomes same collective agreement past	116	1	5	3.97	1.08
Outcomes collective agreements other companies same sector	115	1	5	3.47	1.34
Outcomes for collective agreements other sectors	110	1	5	3.07	1.16
Past readiness for industrial action	108	1	5	3.38	1.32
Readiness for industrial action other companies same sector	111	1	5	2.57	1.35
Readiness for industrial action other sectors	101	1	5	2.07	1.06
Past success of industrial action	98	1	5	3.46	1.36
Success of industrial action other companies same sector	107	1	5	2.71	1.33
Success of industrial action other sectors	97	1	5	2.12	1.10

action, with each relating to: 1) the past experience of the same bargaining unit, 2) that of other companies in the same sector or 3) that of other sectors. The item nonresponse for these measurements varied between 6% and 21%. Additional analyses of the missing cases did not indicate any obvious non-response bias. Descriptive statistics for the nine measurements are presented in Table 4.4.

Overall, information on outcomes had more influence than information on the readiness for, and success of industrial action. The level of influence also increased with proximity of the source of information, i.e., the past experience of the bargaining unit was rated to be more important than that of other companies in the same sector, while that of other sectors had the least impact. Paired t-tests indicated that these differences were all statistically significant ($p<0.01$, two-tailed) with mean differences ranging between 0.5 and 0.8 points. This supports hypothesis H1, predicting that influence would increase with proximity.

We found the highest mean score for the reported influence of information on bargaining outcomes for the same collective agreement in the past with a mean value of almost four on a five-point scale. This finding strongly supports history-dependent wage theories. In line with theories of wage spillover, there was also substantial evidence for spillovers across bargaining units, especially within the same sector. However, the informational content of spillovers was not limited to outcomes. Information on conflict in other bargaining events also influenced the negotiators

considerably, as indicated by the mean values for the items measuring the influence of information on the employees' readiness for, and the success of industrial action. Here too, the influence increased when sources were more proximate. These results lend empirical credence to theories that build on the assumption that conflicts in labor relations are interrelated, such as diffusion theory (c.f. Connel and Cohn, 1995; Biggs, 2002, 2003, 2005) and theories on learning from conflict (e.g., Mauro, 1982, Schnell and Gramm, 1987; Kuhn and Guhn, 1999).

4.5.2 Explaining differences in the influence of external information

To test our remaining hypotheses, we estimated (OLS) multivariate linear regression models for each of the external information models. Every model included main effects for the union negotiator dummy, negotiator experience, age, the female gender dummy, the sector agreement dummy, the log-transformed coverage variable and three dummies controlling for economic sector. We used standard errors that were robust to heteroscedasticity of the residuals (White, 1980) for significance tests. Given constraints on statistical power due to the sample size and the directed nature of our hypotheses, we took $\alpha=0.10$ (two-tailed) as the critical value.

Prior to the model estimations, we analyzed the bivariate associations between all independent and dependent variables by calculating Pearson's correlation coefficients and applying independent sample t-tests where appropriate. These statistics are not presented here in full but we report any statistically significant (based on a liberal one-tailed critical value of $\alpha=0.10$) bivariate association between the dependent and independent variables that did not persist in the multivariate analyses (see Appendix C for a full report on these bivariate associations). In this way, we aim to provide both stringent hypotheses tests as well more tolerant descriptions of associations in our data. For the spillover measurements, the missing cases may reasonably be assumed to be missing at random and ignorable. As there were no missing cases on the independent variables, we used complete case analyses, which under these conditions can be considered to be unbiased and cannot be improved upon (Allison, 2001).

Explanatory analyses

Table 4.5 lists the estimates for the models explaining each of the general types of external information. Hypothesis H2 predicted that external information would have more influence on union negotiators than on firm negotiators. This hypothesis was partially supported by our findings. The reported influence of sectoral and local employment developments, and militancy were all higher for union negotiators. The effect was particularly large for militancy, where the predicted value on a six-point scale was 1.35 points higher for union negotiators than for firm negotiators. The bivariate analyses suggest that information on national employment developments,

strike funds, collective agreement developments in comparable companies also had more influence on union than on firm negotiators.

We tested competing hypotheses concerning the direction of the association between experience and the influence of external information (H3a/b). The results of the multivariate analyses indicate that experience had statistically significant but small positive effects on the reported influence of militancy and international collective agreement developments. Modest positive bivariate correlations between experience and the influence of local employment developments, as well as international and national pricing developments were found. These results run against the hypothesis that, as experience increases, the influence of external information decreases (H3a) but offer some support for the alternative hypothesis that this influence increases as negotiators become more experienced (H3b).

Within a single mixed bargaining system, we found very limited support for the proposition that sector bargaining is less influenced by its wider economic environment than company bargaining (H4). Controlling for other factors, negotiators in sector agreements were not found to be less affected by economic information than negotiators in company agreements. However, the mean of the reported influence of information on sectoral and local employment developments was found to be lower for sector bargaining than for company bargaining in the biviarate analyses.

The influence of information on both international and local collective agreement developments was lower for negotiators in sector agreements than for negotiators in company agreements. These findings partially support hypothesis H5 and also suggest that, although the influence of international developments was limited, it was stronger for the generally more internationally exposed bargaining units that bargain individually. Also in line with hypothesis 5, the influence of collective agreement developments in comparable companies was also found to be lower for negotiators in sector bargaining, but only in our bivariate analyses.

Table 4.6 shows the effects on our nine measures of spillovers as found in the multivariate analyses. On the whole, we found more support for the hypothesis that external information has more influence on union negotiators than on firm negotiators (H2), at least regarding conflict-related information on other bargaining events. In particular. the predicted influences of information on past readiness for, and the success of industrial action was higher for union negotiators by approximately one point on a five-point scale. Similarly, information on the readiness for, and success of industrial action in other companies in the same sector and in other sectors had more influence on union negotiators, although here the differences were less extreme.

Surprisingly however, the two types of negotiators did not differ significantly regarding the reported influence of information on outcomes in other bargaining events, controlling for other factors. This suggests that effects which are traditionally

Table 4.5 OLS regression estimates of the effects of negotiator and bargaining unit characteristics on the reported influence of different types of external information (N=123)

Dependent variable	Employment developments			Pricing developments		
	National	Sector	Local	International	National	Sector
Intercept	2.18*	2.76**	3.24**	1.86[a]	2.30[a]	3.25*
	(1.01)	(1.00)	(1.07)	(1.02)	(1.26)	(1.24)
Firm negotiator	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)
Union negotiator	0.36	0.96**	0.58[a]	-0.37	-0.02	-0.19
	(0.32)	(0.32)	(0.32)	(0.32)	(0.35)	(0.36)
Negotiator experience	0.01	0.01	0.04	0.04	0.03	0.03
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)
Age	-0.02	-0.01	-0.02	0.00	-0.00	-0.00
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)
Male	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)
Female	-0.33	0.26	0.10	0.56	0.07	-0.19
	(0.38)	(0.37)	(0.39)	(0.39)	(0.43)	(0.42)
Company agreement	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)
Sector agreement	-0.31	0.41	-0.24	0.19	-0.42	0.11
	(0.43)	(0.37)	(0.39)	(0.44)	(0.43)	(0.52)
Coverage (log)	0.14[a]	0.01	-0.14*	-0.05	0.05	-0.04
	(0.08)	(0.07)	(0.07)	(0.08)	(0.08)	(0.09)
Economic sector (dummy)						
Primary	-0.18	0.59	-0.65	-0.57	-0.28	0.18
	(0.61)	(0.37)	(0.56)	(0.62)	(0.62)	(0.67)
Secondary	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)
Tertiary	-0.04	0.08	-0.57[a]	-0.21	0.34	-0.21
	(0.33)	(0.33)	(0.32)	(0.34)	(0.34)	(0.36)
Quarternary	1.51*	0.83	0.74	-1.41*	-0.22	-0.05
	(0.65)	(0.58)	(0.72)	(0.58)	(0.89)	(0.86)
R^2	0.11*	0.13*	0.17**	0.11*	0.05	0.03

[a] Statistically significant at the 0.10 level (two-tailed);
* at the 0.05 level
** at the .01 level
*** at the .001 level.
Source: 2011 Dutch Negotiator Survey.

Organizational indicators			Collective agreement developments				
Militancy	Strike funds	Public opinion	International	National	Sector	Local	Comparable companies
3.57**	1.10	2.20*	1.62[a]	4.73***	6.10***	4.28***	6.05***
(1.13)	(0.78)	(0.98)	(0.83)	(0.70)	(0.84)	(1.13)	(0.95)
(ref)	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)
1.35***	0.25	-0.09	-0.01	0.16	-0.02	-0.21	0.49
(0.33)	(0.21)	(0.27)	(0.26)	(0.22)	(0.28)	(0.33)	(0.32)
0.04[a]	0.00	0.02	0.04[a]	-0.02	0.02	0.01	-0.01
(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
-0.03	0.00	-0.03[a]	-0.02	0.00	-0.05*	-0.01	-0.02
(0.02)	(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)
(ref)	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)
-0.01	0.27	0.15	0.23	-0.31	-0.09	0.04	-0.12
(0.41)	(0.32)	(0.34)	(0.34)	(0.29)	(0.37)	(0.40)	(0.45)
(ref)	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)
-0.48	-0.37	-0.63	-0.62[a]	0.36	0.10	-0.73[a]	-0.11
(0.43)	(0.30)	(0.42)	(0.36)	(0.29)	(0.39)	(0.40)	(0.45)
-0.09	-0.04	0.12	0.06	-0.06	-0.04	-0.19*	-0.24***
(0.08)	(0.07)	(0.08)	(0.08)	(0.06)	(0.07)	(0.08)	(0.07)
0.19	-0.36	-0.05	-0.53	-0.12	0.00	-0.51	-0.54
(0.55)	(0.30)	(0.49)	(0.40)	(0.34)	(0.34)	(0.52)	(0.61)
(ref)	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)
-0.01	-0.05	0.18	-0.07	-0.62*	-0.16	-0.35	-0.00
(0.35)	(0.26)	(0.29)	(0.31)	(0.23)	(0.28)	(0.35)	(0.31)
0.65	0.44	0.79	-0.52	-0.47	0.23	-0.06	-0.57
(0.63)	(0.53)	(0.67)	(0.49)	(0.52)	(0.60)	(0.67)	(0.95)
0.22***	0.07	0.07	0.10[a]	0.10	0.07	0.20***	0.20***

Table 4.6 OLS regression estimates of the effects of negotiator and bargaining unit characteristics on the reported influence of different types of spillover

Dependent variable	Outcomes		
	Past	Same sector	Other sectors
Intercept	3.16***	4.67***	3.15***
	(0.58)	(0.89)	(0.75)
Firm negotiator	(ref)	(ref)	(ref)
Union negotiator	0.20	0.43	0.38
	(0.23)	(0.27)	(0.23)
Negotiator experience	-0.01	-0.01	0.01
	(0.02)	(0.02)	(0.02)
Age	0.01	-0.01	-0.02
	(0.01)	(0.02)	(0.02)
Male	(ref)	(ref)	(ref)
Female	0.40[a]	-0.60[a]	0.16
	(0.23)	(0.35)	(0.26)
Company agreement	(ref)	(ref)	(ref)
Sector agreement	-0.55[a]	-0.23	0.14
	(0.28)	(0.36)	(0.33)
Coverage (log)	0.06	-0.08	0.06
	(0.05)	(0.07)	(0.07)
Economic sector (dummy)			
Primary	0.38	-0.03	0.46
	(0.30)	(0.59)	(0.41)
Secondary	(ref)	(ref)	(ref)
Tertiary	0.03	0.31	-0.27
	(0.22)	(0.27)	(0.27)
Quarternary	0.36	-0.42	0.59
	(0.39)	(0.66)	(0.43)
N	116	115	110
R^2	0.07	0.15*	0.13*

[a] Statistically significant at the 0.10 level (two-tailed);
* at the 0.05 level
** at the .01 level
*** at the .001 level.
Source: 2011 Dutch Negotiator Survey.

Readiness for industrial action			Success of industrial action		
Past	Same sector	Other sectors	Past	Same sector	Other sectors
3.32***	3.01***	1.96*	3.88***	3.76***	2.32**
(0.72)	(0.91)	(0.84)	(0.82)	(0.83)	(0.90)
(ref)	(ref)	(ref)	(ref)	(ref)	(ref)
1.11***	0.53[a]	0.47*	1.01**	0.49[a]	0.60**
(0.26)	(0.27)	(0.23)	(0.29)	(0.27)	(0.22)
-0.01	-0.01	-0.00	-0.00	-0.02	-0.02
(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
-0.01	-0.01	-0.01	-0.03[a]	-0.01	-0.01
(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
(ref)	(ref)	(ref)	(ref)	(ref)	(ref)
-0.26	-0.22	-0.43[a]	-0.04	-0.34	-0.08
(0.24)	(0.37)	(0.26)	(0.35)	(0.37)	(0.27)
(ref)	(ref)	(ref)	(ref)	(ref)	(ref)
-0.83*	-0.46	-0.56	-0.94*	-0.76*	-0.27
(0.38)	(0.40)	(0.35)	(0.41)	(0.36)	(0.32)
0.02	-0.01	0.06	0.09	-0.07	0.00
(0.08)	(0.08)	(0.07)	(0.08)	(0.07)	(0.06)
-0.10	-0.19	0.36	-0.13	0.08	0.85[a]
(0.43)	(0.38)	(0.32)	(0.57)	(0.44)	(0.43)
(ref)	(ref)	(ref)	(ref)	(ref)	(ref)
0.02	-0.07	0.06	0.11	0.29	0.12
(0.29)	(0.30)	(0.24)	(0.30)	(0.29)	(0.25)
1.14**	0.52	0.86	1.74***	0.74	1.10[a]
(0.41)	(0.70)	(0.56)	(0.44)	(0.68)	(0.56)
108	111	101	98	107	97
0.28***	0.08[a]	0.12*	0.27***	0.18**	0.16

often ascribed to the formation of reference points by workers and unions, i.e., wage spillovers and state-dependency of wages, may actually have affected both sides of the bargaining table equally. This may be because employers correctly anticipate the importance of such reference points to their counterparts (c.f. Bewely, 1999), but it may also be the case that firm negotiators themselves are guided by external reference points rather than strictly by internal information on viable outcomes. However, it must be noted that bivariate tests did point towards more influence on union negotiators compared to firm negotiators for information on outcomes in other companies in the same sector and in other sectors.

We found no further evidence of the hypothesis that the influence of external information increases with experience (H3b) in our multivariate analyses, while bivariate tests even hinted at a negative correlation between the influence of the success of industrial action in other sectors and negotiator experience.

As predicted in hypothesis H5, spillovers had less influence on negotiators in sector bargaining than in company bargaining. The multivariate analyses suggested that this was the case for the influence of past outcomes, as well as past readiness for, and the success of industrial action, and the success of industrial action in other companies in the same sector. However, the bivariate analyses did not show a uniform pattern. While the influence of outcomes in the same sector was lower in company bargaining than in sector bargaining, the influence of outcomes in other sectors and the readiness for industrial action in the same sector was actually higher.

4.6 Conclusion and discussion

The impetus for this research was the surprising lack of comparable empirical data on the influence of external information on union and firm negotiators, given the importance attributed to this information in theories explaining the outcomes and conflicts in collective bargaining. Using a standardized survey questionnaire measuring the influence of external information in the Netherlands, we sought to address two research questions: 1) *to what extent are negotiators in collective bargaining influenced by different types of external information?* and 2) *to what extent can differences in the influence of external information between negotiators can be explained by characteristics of the negotiators, of bargaining units and the type of information?*

Our analyses revealed a multifaceted picture of the influence of external information on collective bargaining. Economic indicators (i.e., employment and pricing developments), particularly those operating at the sector level, had substantial influence on negotiators. Information on national and sectoral collective agreement developments was also very influential, while indicators reflecting organizational power, i.e., militancy, strike funds and public opinion, were less important.

Another major influence on negotiators was information on other bargaining events, i.e., spillovers. We differentiated spillovers according to their source and informational content and found that information on outcomes had more influence than information on the readiness for, and success of industrial action. The hypothesis that influence increases with the proximity of the source of spillovers was also strongly supported, with information on the past experience of the bargaining unit having more influence than information on other bargaining units within the same sector, while information on other sectors had the least influence. These findings provide empirical underpinnings for theories assuming that bargaining events influence each other, but also highlight the importance of distinguishing between sources and types of information spillover.

We found considerable evidence in favor of the hypothesis that union negotiators are generally more influenced by external information than firm negotiators. Union negotiators appeared to be particularly more concerned with information on local and sectoral employment, and militancy. They were also more influenced by spillovers, particularly when the content of these was related to conflict.

It was not a priori clear what type of relationship between experience and influence of external information to expect. Our findings suggest that more experienced negotiators were more influenced by some types of external information, i.e., militancy and international collective agreement developments, but the associations were of rather modest size.

We found little evidence suggesting that sector bargaining was less affected by its wider economic environment than company bargaining. However, negotiators in sector bargaining were less affected by international and local collective agreement developments and some types of spillovers than those in company bargaining, suggesting that sector bargaining operates with relatively more autonomy.

Recent studies have documented that across European countries, specific sectors are converging (Bechter et al., 2012) and appear to be affected by transnational wage coordination (e.g Traxler and Brandl, 2009; Ramskogler, 2012; Glassner & Pusch, 2013). Our findings suggests that the impact of international collective agreement developments in the Netherlands is still modest compared to the impact of developments within the country, but the sample did not allow for a sufficiently fine-grained sector-classification to identify particular sectors that were more internationally influenced. However, our findings of modest international spillovers, coupled with substantial within-country spillovers, suggest that it may be important to consider indirect effects that may result when influential wage leaders within a country are themselves affected by international developments.

Our analyses of the questionnaire survey data yielded an empirical basis for a number of assumptions and tacit understandings commonly found in employment relations literature. The cross-sectional analysis of a single country presented here

shows that obtaining information from negotiators directly offers interesting insights into collective bargaining. Some of our findings seem to reflect the specific national context in which we collected our data, i.e., dominant sector bargaining, a multileveled collective bargaining system and relatively low levels of industrial conflict. Hence, analyses of the influence of external information in different institutional and economic settings may provide important additional insights. It is therefore our hope that future research will replicate our analyses in different periods and contexts and that large-scale country comparative surveys will incorporate our design. Future research should also consider the effects of external information on the outcomes of, and conflicts in collective bargaining.

5

Spillovers and conflict in collective bargaining: evidence from a survey of Dutch union and firm negotiators[53]

53 A slightly different version of this chapter has been published in *Work, Employment and Society* (Lehr, Akkerman & Torenvlied, 2015). An earlier version of this chapter was presented at the IREC, Bucharest, Romania, September 2013.

Abstract

With unique survey data of Dutch collective agreement negotiators, the authors model how information about other collective bargaining events influences the probability of negotiators encountering bargaining impasses or industrial action during collective bargaining. Competing hypotheses about this influence, derived from mainstream and behavioral economic bargaining theory, and from sociological approaches are tested. The findings indicate that information about bargaining outcomes elsewhere has no significant effect on the occurrence of conflict. However, if the information content of spillovers refers to the conflict potential in other bargaining events and the sources of information are proximate, it increases the probability of conflict. This suggests that sociological mechanisms offer a compelling alternative to those invoked in economics for explaining the relationship between spillovers and conflict.

5.1 Introduction

This study investigates the impact of information spillovers in collective bargaining, taking the perspective of individual negotiators. Empirical research indicates that spillovers about bargaining outcomes (e.g., wages) and conflicts (e.g., strikes) from past bargaining events and bargaining events in other firms influence the occurrence of conflict in current bargaining events. Several confounding theoretical mechanisms for such spillover effects have been proposed. The central tenet of *mainstream economic bargaining theory* is that spillovers affect negotiators when the information allows them to reduce uncertainty regarding critical private information aspects of the bargain, consequently reducing conflict. Social psychologically inspired *behavioral economic bargaining theories* argue that spillovers are driven by social comparisons and increase the divergence of preferences at the bargaining table, thereby leading to more conflict. Moreover, *sociological theories of diffusion* stress the role of spillovers as potentially conflict-increasing.

Empirical studies on information spillovers and conflict produce mixed and partially contradictory results (e.g., Schnell and Gramm, 1987; Ingram et al., 1993; Babcock et al., 1996; Kuhn and Gu, 1999; Campolieti et al., 2005; c.f. Conell and Cohn, 1995; Biggs, 2002, 2005). Moreover, these studies suffer from two methodological drawbacks. First, with the exception of Babcock et al. (1996), the proposed mechanisms in these studies are not tested directly. Second, influence is inferred from observed correlations between different bargaining events, while such correlations could just as well be caused by unobserved variables affecting these bargaining events simultaneously (cf. Mitchell, 1982; Manski, 1993).

Thus it remains unclear how conflict in one bargaining event is affected by other bargaining events. This study aims to shed new light on this relationship. Using information from Dutch collective agreement negotiators, it addresses the following research question: *how and under what conditions does information about other bargaining events influence the probability of negotiators experiencing conflicts in collective bargaining?*

Negotiator surveys proved successful in wage determination studies but have rarely been used to analyze conflict in collective bargaining. However, such an approach helps to overcome many limitations of official strike statistics (c.f. Franzosi, 1989) and provides important information about key actors determining collective agreements (c.f. Kaufman, 2002). Especially the analysis of spillovers benefits considerably from self-reports of negotiators because they measure the influence of information about other bargaining events directly. For instance, Babcock et al. (1996) study the relationship between spillovers and conflict using a survey of union and firm negotiators of teachers' salaries. They, however, employ considerable a priori limitations on potential reference points (c.f. Mitchell, 1982; Manski, 1993) and types of information spillover.

This study moves beyond the analysis of a single profession and extends the range of potential reference points and types of spillovers under analysis. To this end, a representative sample of Dutch collective agreements was compiled and the negotiators involved were surveyed. Spillover measurements distinguished between different information sources and different informational content of spillover. Moreover, the data recorded not only the occurrence of manifest conflicts such as strikes, but also bargaining impasses, thus uncovering conflicts that remain latent due to organizational and institutional constraints, which are not taken into account in traditional strike statistics. This is important because the absence of manifest conflict (strikes) does not negate the existence of conflict (c.f. Hebdon, 2005; Dix et al., 2008) and impasses impose costs on employers and employees much like strikes do (Kaufman, 1981: 336-337).[54]

Despite declining unionization, collective bargaining still prominently governs many aspects of working life, with an average of 62 percent of all workers in OECD countries covered by a collective agreement (Visser, 2011). In addition, the Global Financial Crisis and its aftermath once more made clear that peaceful labor relations must never be taken for granted. Worsening employment relations have increased the risk of social unrest in the world's advanced economies (ILO, 2013) and prominent scholars argue that the 'long wave' of economic development is returning to a state that will lead to a revival of labor conflict (e.g., Kelly, 1998). The first studies asserting that strikes appear to be resurgent are now emerging (e.g., Brym et al., 2013), while up and coming economies like China face a rapidly increasing number of labor disputes (Cheng et al., 2012). In light of such trends, new insights into the long standing puzzle of spillovers and labor conflict hold particular importance.

5.2 Theory and hypotheses

5.2.1 Rational learning

The classic paradox that has driven the theoretical development of economic bargaining models of industrial conflict may be summarized as follows: conflicts in collective bargaining, both manifest ones such as strikes and latent ones such as impasses (see Kaufman, 1981), are costly to both employers and employees, so why do they not avoid these costs and settle on the eventual outcome immediately? (Hicks, 1932). The general argument in economic bargaining models is that bargaining

54 For instance, prolonging bargaining increases direct costs such as negotiator- and staff salaries, overtime payments related to increased production in anticipation of a strike and increasing the strike risk and its associated cost itself. Moreover indirect opportunity cost arises from the delayed implementation of improvements to work rules and structure.

behavior is determined by negotiators' perceptions of aspects of the bargaining event that are critical to reaching an agreement but are not fully observable to all actors (Cramton and Tracy, 2003). These aspects are typically assumed to be bargaining power and the economic state of the firm (i.e., its profitability and consequently its ability to pay). Negotiators consequently face uncertainty because the true value of these factors is not fully observable (Shalev, 1980). To overcome this uncertainty, they use information that may reveal something about these factors. For instance, industrial relations and labor economics research consistently finds an association between business cycle indicators and strikes (e.g., Franzosi, 1989; Card, 1990; Kaufman, 2002; Cramton and Tracy, 2003). The question of how changes in these business cycle indicators influence strikes (Kaufman, 1981: 334) is generally, although often implicitly, answered by assuming that negotiators use them to overcome their uncertainty about bargaining power or the economic state of the firm.

Similarly to business cycle indicators, information about bargaining events in the past of a bargaining unit and in other bargaining units may be indicative of bargaining power and a firm's economic state (c.f. Burgess, 1988). Hicks contends that 'the majority of […] strikes are doubtless the result of faulty negotiation. […] Any means which enables either side to appreciate better the position of the other will make a settlement easier' (1932: 146-147). Considering that bargaining units exists for multiple contract terms, 'the experience of striking offers the bargaining parties an opportunity to learn from their mistakes. […] Thus one would expect bargaining units that have experienced a stoppage to be less likely to strike during future contract negotiation' (Schnell and Gramm, 1987: 222). In other words, by using the information obtained from previous bargaining events, negotiators improve their knowledge, thereby decreasing the probability of costly mistakes such as strikes or impasses.

A similar reasoning lies at the heart of Kuhn and Gu's (1999) extension of asymmetric information models of strikes that incorporates spillovers across bargaining units. Asymmetric information models became a common solution to the Hicks bargaining paradox in the 1980s and remain highly influential in strike research. These models generally assume that firms are better informed about their ability to pay than employees and their unions. Strikes force this information to be revealed. Firms will only take a strike if its anticipated costs are lower than the costs of giving in to union demands, i.e., they can use a strike to signal their limited ability to pay. Unions may use strikes as screening devices if they believe that firms are misrepresenting their true ability to pay. Kuhn and Gu (1999) argue that the economic state of different firms can be correlated, for instance when they are part of the same industry, due to shared changes in technology and product market conditions. Because outcomes and strikes reveal information about a firm's ability to pay wages, union negotiators in bargaining units that negotiate later may obtain useful information by observing outcomes and strikes in other bargaining units. By bringing union

negotiators' perceptions of the firm's ability to pay closer in line with the firm's true ability to pay, spillovers are assumed to decrease conflict.

These theories share three building blocks 1) strikes are a result of rational action under incomplete information, 2) spillovers improve information (negotiators are implicitly assumed to only be affected by spillovers that serve this function [cf. Kuhn and Gu, 1999: 122]) and 3) improved information reduces conflict. Improving your own information by observing others is referred to by Kuhn and Gu as 'learning'. As this mechanism is based on strong rationality assumptions, it will be referred to as 'rational learning' here and the following hypothesis is derived:

The more a negotiator is influenced by information about other bargaining events, the less likely he or she is to experience conflict in collective bargaining. (Hypothesis 1)

5.2.2 Social comparisons

Tounadre and Villeval (2004) implement an experimental test of Kuhn and Gu's sequential bargaining model and find only limited evidence for conflict-decreasing rational learning across bargaining units, a finding they explain by the impact of fairness and equity considerations. Equity theory stresses that people compare themselves with similar others. Adams (1963: 422) notes that '[t]he fairness of an exchange between employee and employer is not usually perceived by the former purely and simply as an economic matter. There is an element of relative justice involved that supervenes economics and underlies perceptions of equity or inequity'. Therefore, workers will strive for wage rates comparable to those of workers in other companies performing similar tasks (c.f. Frank, 1984; Akerloft and Yellen, 1990; Rees, 1993). Social comparisons of this type govern many decision-making processes (Fehr and Falk, 2002) and empirical studies show that these social comparisons indeed play an important role in collective bargaining (Babcock, et al., 1996, 2005). In addition to comparisons to other workplaces, past wages are major determinants of employees' preferred wages (Bewely, 1999), turning both previous outcomes and outcomes elsewhere into potential reference points (c.f. Tversky and Kahneman, 1991).

Contrary to rational learning, the social comparison mechanism does not assume that spillovers only occur when information is relevant to unobservable critical aspects of the bargaining event. Rather, the evaluation of relevance is guided by self-interest (c.f. Rees, 1993). Because firms and unions have opposing interests, these self-serving biases entail that spillovers will increase the divergence in their preferences, thereby leading to conflict. Social comparisons over time and between bargaining units thus leads to increased demands and conflicts. In contrast to hypothesis 1, this leads us to the following competing hypothesis:

The more a negotiator is influenced by information about the outcomes of other bargaining events, the more likely he or she is to experience conflict in collective bargaining. (Hypothesis 2a)

5.2.3 Rational learning revisited: the sociological perspective

Spillovers are an example of social influence, which figures prominently in sociological theory. For instance, it is argued that facing uncertainty, organizations and their leaders mimic other organizations (DiMaggio and Powell, 1983; Fligstein, 1985). Such organizational learning theories (see Levitt and Marc, 1988) stress the importance of diffusion in organizational networks. Similarly, following Coleman et al. (1957), the decisions of individual actors are argued to be affected by their observation of the behaviour of others (see also Burt, 1987; Strang and Tuma 1993). Highlighting the shortfalls of an atomized conception of actors (Granovetter, 1985), a number of theoretical models (e.g., Granovetter, 1978) have been developed sharing the core notion that an individual's propensity to initiate some action is positively affected by the number of others who have previously done so (Hedström and Swedberg, 1996). In a context of uncertainty, imitation is an *ex ante* rational strategy (Hedström, 1998), leading to the diffusion of behaviours.

Theories of diffusion have been applied to the analysis of societal conflict (e.g., McAdam, 1983), including strikes. Examining aggregate data on strikes in America, Chicago and Paris in the late nineteenth century, Biggs (2003, 2005) concludes that diffusion[55] plays an important role in strike waves. He proposes inspiration as a mechanism for diffusion between workplaces, as strikes elsewhere create occasions for deciding to strike (c.f. Oliver, 1989) and raise the hope of favorable results, especially when the observed strike is successful. Analyzing strikes in coal mines in French departments for the period 1890-1935, Conell and Cohn (1995) find that strikes, even unsuccessful ones, in one department increase the strike rate in other departments. They propose three mechanisms, as information about strikes in other workplaces may 1) raise workers' awareness of their own grievances; 2) serve a date setting function and 3) offer tactical guidance by signaling favorable conditions for strike action.

The difference between diffusion-based approaches in sociology and rational learning theories in economics is remarkable. Whereas the latter associates spillovers with decreased conflict, the former stresses its conflict-increasing effects. This is especially noteworthy because both mechanisms are based on models of rational actors using information about events elsewhere to make decisions under uncertainty. However, while spillover models in economics were developed for contexts of

55 In Biggs' terminology, the process is referred to as 'positive feedback'.

unionized workers and collective bargaining, sociological diffusion theories until now have only been considered for periods preceding the institutionalization and pacification of industrial relations (c.f. Biggs, 2005: 1685). To apply these insights to spillovers in contemporary collective bargaining, one must account for a number of crucial differences between the two contexts: 1) The locus of decision making has shifted from individual workers to trade union- and employer representatives. Even though industrial action is still carried out by workers, conflicts now emanate from decisions made at the bargaining table. 2) Date setting and consciousness-raising are unlikely to be significant mechanisms leading to spillovers between bargaining units nowadays (Conell and Cohn 1995: 372). 3) Overt industrial conflict is much less frequent, limiting the number of observable events. 4) Collective bargaining occurs at fixed intervals, creating a series of related bargaining events. This means that it is no longer just spillovers from other workplaces that may trigger conflict, information about the past bargaining events in the own bargaining unit is likely to also be very influential.

To apply the lessons of diffusion models to contemporary collective bargaining, this study considers the effects of diffusion on negotiators. Negotiators are aware of what happens in other bargaining events through their personal and intra-organizational networks as well as the public media. Furthermore, professional trade union and employers' negotiators are involved in many different bargaining events, offering first hand access to information about them. Because mobilizing potential, strike funds, public support and profits and bargaining power are often similar to bargaining events in the past and in other bargaining units, observing workers' (un-)willingness to participate in industrial action and the success of conflicts provides valuable tactical guidance.

Conflicting interests are inherent to the distributive nature of collective bargaining. Yet escalation is costly and its outcomes uncertain. Negotiators only risk conflict when they expect that the benefits will outweigh the costs. Information about other bargaining events is invaluable for such decisions. All else equal, negotiators who make more use of information about conflict potential in other bargaining events experience less uncertainty and are therefore more likely to choose conflict over compromise. Against hypothesis 1, the following competing hypothesis is proposed:

The more a negotiator is influenced by information about the conflict potential in other bargaining events, the more likely he or she is to experience conflict in collective bargaining. (Hypothesis 2b)

5.2.4 Differences between union and firm negotiators

Strict adherence to the asymmetric information model used by Kuhn and Gu (1999) would suggest that only union negotiators need to reduce uncertainty by learning

from other bargaining events, as firm negotiators are assumed to possess perfect information about their ability to pay. Therefore, the use of information about other bargaining events by firm negotiators cannot reduce the probability of conflicts. Social comparisons are traditionally primarily associated with worker's rather than employers' perceptions of reference wages. Past diffusion models of industrial conflict considered the conflict increasing effects of spillovers to affect workers rather than firm owners. In contemporary labour relations, in which wages are predominantly determined under collective bargaining, something similar may hold true, albeit it for different reasons. For trade unions, high demands and industrial action can be of substantial propagandistic value for attracting new members (Akkerman, 2008). Conflict potential in other bargaining events, regardless of its impact on the collective agreement, reveals important information about possible gains in membership from tough bargaining strategies. This implies that, particularly for union negotiators, these spillovers reduce uncertainty about the benefits of tough bargaining and may be sources of inspiration for imitative conflict. Hence whatever the direction of the effect of spillovers on conflict, each theoretical approach suggests that this effect is stronger for unions than for firms, leading to the following interaction hypothesis:

The association between the influence of information about other bargaining events and experiencing conflict in collective bargaining is stronger for union negotiators than for firm negotiators. (Hypothesis 3)

5.3 The empirical context

5.3.1 Collective bargaining in the Netherlands

The Dutch economy features a large service sector, its share of the GDP being 74%, whereas manufacturing accounts for 23% (EIRO, 2008). The Netherlands has traditionally been a pillarized society, divided along religious, ideological and status lines. Dutch industrial relations still reflect these divides, with the three major trade union federations representing Christian-democratic, social-democratic and white-collar interests (Ibid., 2008). Multi-unionism, where different trade unions are involved in the same bargaining event, is common in collective bargaining in the Netherlands (Akkerman, 2000, 2008). Trade union density had been declining in the past (Visser, 1992: 349) and is now relatively stable at approximately 24% (EIRO, 2008). Collective agreement law requires that employers apply the collective agreement to all employees, regardless of their membership. The Ministry of Social Affairs and Employment usually extends sector level collective agreements, through which all employees in the sector are covered (Rojer, 2002). Consequently, collective bargaining coverage in The Netherlands is currently above 80% (EIRO, 2008).

The Netherlands exhibit both sector- and company-level bargaining, with the sector level being dominant. There are approximately 1,000 collective agreements, of which approximately 20% are sector agreements. These may act as framework agreements to company-level bargaining (EIRO, 2008), i.e., in some cases there is a mixture of both types of agreements.

The Dutch system may be typified as state-sponsored coordination (Traxler, 2003). Two important institutions coordinate labor relations at the national level. In the bi-partite Labour Foundation, peak organizations of trade unions and employer organizations meet. The Labour Foundation produces central agreements, which are not legally binding for the members of the peak organizations but carry significant weight as benchmarks for sector- and firm-level bargaining (Torenvlied and Akkerman, 2002, 2004). During semi-annual consultations with the government, the Labour Foundation negotiates over social economic issues, such as the preferred wage increase. In addition to the Labour Foundation, representatives of the three main trade union federations, the three main employer confederations and independent members appointed by the government meet in the Social Economic Council (SER). The SER consults and acts as an advisory council on all major social and economic issues (EIRO, 2008).

5.3.2 Industrial conflict in The Netherlands

Compared to most other European countries, there is little strike activity in The Netherlands. The official annual number of strikes between 2005 and 2011 varied between 17 to 31. Approximately half of these strikes were related to disputes in collective bargaining (CBS, 2012). The annual number of work days lost through industrial action varied substantially during this period, peaking at 120,600 in 2008 and dropping as low as 4,600 in 2009. Between 2005 and 2011, the number of workers involved in industrial action was also highest in 2008 (51,900) and lowest in 2009 (3,600) (Ibid., 2012). Industrial action is most prevalent in manufacturing and transport.

Conflicts in collective bargaining are usually resolved by the bargaining parties themselves and occasionally through a mediator. The right to strike is recognized through the recognition of the European Social Charter and extends to the public sector. Employers may resort to legal action to prevent strikes. Although no distinction is made between essential and non-essential services, third-party interest may be invoked as restriction on the right to strike (EIRO, 2002; EUROFOUND, 2012). The number of court interventions to industrial action is relatively high (EIRO, 2002), suggesting substantial conflict arising from collective bargaining that remains at least partially hidden from official strike statistics.

5.4 Data and measurements

5.4.1 Sample

Data from the 2011 Dutch Negotiator Survey were used. The initial sample for this survey consisted of negotiators of 125 company agreements and 42 sector agreements. 150 of these agreements were selected via a randomized procedure from the pool of the approximately 1000 collective agreements. An additional sample of 17 agreements was added to the random sample to ensure sufficient variation on the dependent variable. These agreements were selected on the basis of prior knowledge that there had been a bargaining impasse in the form of an union ultimatum. Data collection began in October 2011 and ended in January 2012. To limit the impact of potential retrospective bias, only agreements with starting dates from 1 January 2009 onwards were included. Moreover, to minimize the probability of collecting data on bargaining events that were still in progress, agreements with start dates after 1 April 2011 were excluded.

Through contacts with firms, trade unions and employer organization, as well as the extensive document analysis of (preliminary) contracts, official correspondences, communiqués and media coverage, 307 negotiators involved in the 167 collective agreements included in the sample were traced and invited by email for an online survey. Five of the negotiators were involved in several of the collective agreements in the sample but were surveyed for just one.

The survey consisted of questions about (1) negotiators' background characteristics, (2) various types and sources of information affecting collective bargaining and (3) characteristics of the collective bargaining event on the basis of which they were selected into the sample. Respondents were also asked to list the five most important other negotiators involved in their collective bargaining event. This strategy yielded 144 additional negotiators, who were subsequently invited to participate in the study. In total, 451 negotiators were invited, of whom 54.10% were union negotiators and 45.90% representing the interests of the firms. After two reminders, the non-responding negotiators were contacted by telephone. A total of 128 negotiators involved in 78 of the 167 selected collective agreements completed the questionnaire. The response rates were 31.96% for union negotiators and 24.15% for firm negotiators, common response rates for surveys of professional organization representatives. No significant non-response bias was found regarding the distribution of union and firm negotiators and sector and company agreements.

5.4.2 Measures

Dependent variable

Conflict in collective bargaining was measured by asking negotiators whether an impasse had occurred in their bargaining event and if affirmed, whether any collective

action was initiated by the workers and/or union(s) in the bargaining event. From these questions, an ordinal variable was created, with '0' for 'no conflict', '1' for 'impasse, but no industrial action' and '2' for 'industrial action'. If an impasse was reported, the type of impasse and the substantive reasons for this impasse was asked. An overview of the types of impasses and their reasons is reported in Appendix D, Tables D1 and D2.

Independent variables

Spillovers may entail various types of informational content, each potentially differently associated with bargaining impasses. The statements used to measure spillovers distinguished three types of informational content[56]: information about 1) outcomes, 2) employees' readiness for industrial action and 3) the success of industrial action. Besides informational content, sources of spillovers may vary. Three potential sources were distinguished: 1) the past of the own bargaining unit (prior contract periods), 2) other companies within the same sector, 3) companies in other sectors. Respondents were thus asked to rate their agreement with nine statements about the influence of a particular type of information on their collective bargaining. These nine statements are shown in Chapter 4, Table 4.1. Possible answers ranged from '1' 'not at all' to '5' 'very much', with a higher value indicating more influence of that type of information.[57] To test whether the association between spillovers and conflict is different for union and firm negotiators, dummy variable was created for 'union negotiator', where the firm negotiators represented the reference category.

Spillover scales

The limited sample size necessitated parsimonious multivariate models. Seeking for a meaningful reduction of the number of independent variables, a principal component analysis was performed.[58] Appendix D, Tables D3 and D4 provide detailed information

56 The favourability of information for negotiators was not quantified for three reasons: 1) Theoretically, the predicted prevailing effects of spillover on conflict is independent of favourability (see also the designs and findings of Conell and Cohn, 1995; Kuhn and Gu, 1999; and Biggs, 2005). 2) Empirically, such an exercise would entail a selective choice of specific bargaining events on part of the researcher leading to the problem of a priori limiting potential reference points. 3) The validity of such measurements, i.e. researchers' coding the potential favourability of specific information about specific bargaining events to negotiators in other specific bargaining events, is at best problematic.

57 Given that some sectors exhibit a mixture of company and sector agreements, spillovers from other companies within the same sector cannot be a priori excluded even for sector agreements. However, some respondents that were selected for the involvement in sector agreements had missing values for this information source. Their responses were substituted with the lowest possible value, indicating no influence.

58 The PCA was replicated with different treatments of missing values, i.e. listwise deletion and various imputation models. The extracted components and factor loadings remained reasonably stable and lead to substantively similar interpretations throughout.

on the bivariate correlations of the items and the PCA), which produced two components with an Eigenvalue larger than 1. The first component reflected the influence of information about readiness for- and success of industrial action in the past of the bargaining unit and within the same sector (for these four items, Cronbach's α=0.89). The second component showed high loadings on the influence of information about outcomes, readiness for- and success of industrial action in other sectors and medium loadings for information about past outcomes and outcomes in the same sector (for these 5 items, Cronbach's α=0.76).

Regression-scores for each case on the two components were calculated for subsequent analysis. The substantive interpretation of the first component is straightforward as the items clearly reflect information about conflict potential from proximate sources. The variable measuring these component scores was therefore labeled 'proximate conflict spillover'. For the second component, the interpretation is less straightforward, with items referring primarily to information about other sectors and to a lesser extent to outcomes. The variable measuring its component scores was labeled 'distal and outcome spillover'.

Control variables

Montgomery and Benedict (1989) find that negotiator experience reduces strike incidence (c.f. Reder and Neumann, 1980). The analysis therefore controlled for negotiator experience, measured as the number of times a negotiator was previously involved in bargaining for the particular collective agreement for which he or she was selected into the sample.[59] Bargaining level, the size of bargaining unit and sector-specific economic conditions were also controlled for, using a dummy variable indicating sector agreements (with company agreements being the reference category), a variable for (the logarithm of) the number of employees covered by the agreement and a categorical variable distinguishing between the primary, secondary (reference category), tertiary (commercial services) and quaternary[60] (non-commercial services).

59 Alternatively, the estimates were also controlled for the impact of negotiator experience, measured as the number of years a respondent had been active as a collective agreement negotiator. This treatment did not alter the findings.

60 Two of the contracts in the sample were public sector agreements. The robustness of the findings was confirmed by repeating all analyses excluding the corresponding negotiators.

5.5 Analyses

5.5.1 Descriptive statistics

Table 5.1 provides descriptive statistics on the variables. Of the 128 respondents, 44 reported no conflict, 72 experienced a bargaining impasse and in 12 cases, there was industrial action. The past of a bargaining unit was the most influential source of spillover, followed by companies in the same sector, whereas information about other sectors was less influential. Furthermore, the reported influence of information about outcomes was generally higher than the influence of information about employees' readiness for industrial action and about the success of industrial action. On the whole, these statistics suggest that negotiators are influenced by information spillovers both within and between bargaining units and that this influence is larger when the source of information is more proximate.

5.5.2 Exploring the association between spillovers and conflict

As a first step towards understanding the connection between spillovers and conflict, the extent to which the mean values for the nine measurements of spillovers differ between those negotiators who experienced some type of conflict (i.e. an impasse or industrial action) and those who did not was investigated (a full report of these bivariate analyses is available in Appendix D, Table D5). The mean value was higher among those who had experienced conflict for all items. Independent sample *t*-tests revealed that the mean differences were not statistically significant for items relating to outcomes of bargaining. However, the differences between mean values were found to differ significantly with p at least <0.1 (two-tailed) for all items relating to readiness for industrial action and to success of industrial action. These findings point towards a positive association between spillovers and conflict, in particular in those cases where the informational content of spillovers pertains to conflict potential.

5.5.3 Multivariate analyses of spillovers and conflict

To control for possibly confounding factors and test the interaction hypothesis, multivariate regression models of the effect of spillovers on conflict were estimated. These models are reported in Table 5.2. The first main independent variable was the 'proximate conflict spillover' scale, referring primarily to the influence of information about the readiness for- and success of industrial action in the past and within the same sector. The second main independent variable was the 'distal and outcome spillover' scale, which mainly captured the influence of information about other sectors and about bargaining outcomes.

The dependent variable is ordinal. Likelihood-ratio tests of the proportionality of odds across response categories (Wolfe and Gould, 1998) showed that the parallel regression assumption was not violated. Thus ordinal logistic regression models

Table 5.1 Descriptive statistics

	Valid N	Min.	Max.	Mean	Standard deviation
Conflict	128	0.00	2.00	0.75	0.61
Union negotiator (ref. firm negotiator)	128	0	1	0.61	
Negotiator experience	128	0.00	16.00	3.03	3.21
Sector agreement (ref. company agreement)	128	0	1	0.32	
Number of employees covered by collective agreement	128	18	819500	17583.56	75686.22
Outcomes same collective agreement past	121	1	5	3.95	1.08
Outcomes collective agreements other companies same sector	119	1	5	3.46	1.32
Outcomes for collective agreements other sectors	115	1	5	3.06	1.16
Past readiness for industrial action	113	1	5	3.37	1.31
Readiness for industrial action other companies same sector	116	1	5	2.59	1.34
Readiness for industrial action other sectors	106	1	5	2.08	1.07
Past success of industrial action	102	1	5	3.46	1.35
Success of industrial action other companies same sector	112	1	5	2.72	1.32
Success of industrial action other sectors	102	1	5	2.12	1.11

Source: 2011 Dutch Negotiator Survey.

were fitted. Because in the sample there were negotiators from the same bargaining event, not all observations are independent. Therefore, cluster robust standard errors were estimated. Following Hagle and Mitchell (1992), McKelvey and Zavoina's R^2 was calculated, which may be interpreted as a close approximation of the R^2 one would obtain from fitting an OLS regression to the latent dependent variable representing the probability that the outcomes occur.

Model 1 in Table 3 shows the effects of proximate conflict spillovers, as well as distal and outcome spillovers on conflict. According to hypothesis 1, spillovers decrease conflict while hypothesis 2a predicts that spillovers related to outcomes increase conflict and hypothesis 2b states that spillovers related to conflict potential increase conflict. The findings indicate that if negotiators are more influenced by proximate conflict spillover, they are more likely to experience conflicts ($p=0.016$). An

Table 5.2 Ordered logistic regression estimates of the effects of different types of spillovers on probability of experiencing conflict in collective bargaining (N = 112)

	Model 1		Model 2	
Independent Variables	**b**	**s.e.**	**b**	**s.e.**
Proximate conflict spillover	0.46*	0.19	0.67**	0.23
Distal and outcome spillover	0.09	0.18	0.15	0.19
Negotiator (dummy)				
Firm			Reference	
Union			0.26	0.49
Negotiator experience			0.06	0.05
Agreement (dummy)				
Company			Reference	
Sector			1.03[a]	0.57
Number of employees covered by collective agreement			-0.01	0.11
Economic sector (dummy)				
Primary			-0.22	0.97
Secondary			Reference	
Tertiary			-0.00	0.48
Quaternary			1.60*	0.78
Wald X^2	5.79		28.69	
df	2		9	
McKelvey and Zavoina's pseudo R^2	0.13		0.21	

[a] Statistically significant at the 0.1 level (two-tailed);
* at the .05 level
** at the .01 level
*** at the .001 level.
Source: 2011 Dutch Negotiator Survey.

increase from the minimum to the maximum observed value on this scale was associated with a decrease by 0.45 of the predicted probability of no conflict, whereas the probabilities of an impasse and of industrial action increased by 0.27 and 0.18, holding the distal and outcome spillovers scale at its mean value. This finding runs against hypothesis 1 and offers support for the competing hypothesis 2b derived from sociological perspectives. Distal and outcome spillovers do not significantly affect conflict. This suggests that spillovers predominantly increase conflict if the information refers to conflict potential and sources are sufficiently proximate and that

neither the predictions based on rational learning (H1) nor social comparisons (H2a) are supported.

For model 2, the dummy for union negotiator and the control variables negotiator experience, sector agreement, number of employees covered by the contract and economic sector were added. The ordered logit estimate for proximate conflict spillovers increased compared to model 1 and was statistically significant at $p=0.004$. Figure 1 illustrates the predicted probabilities as estimated in this model. For each of the three potential values for conflict, a line is drawn along the predicted probabilities for that value on the y-axis and the observed range of the proximate conflict spillovers scale on the x-axis. From left to right, the downward sloping line shows the decreasing probability of no conflict as the scores on proximate conflict spillovers increase, while the two upward sloping lines conversely show the increasing probability of impasses and industrial conflict.

To assess the robustness of these findings, the effects of the nine items used to measure spillovers were also estimated separately (Appendix D, Table D7). Overall, the findings were very similar. However, conflict was also found to increase as the reported influence of information about the readiness for industrial action in other

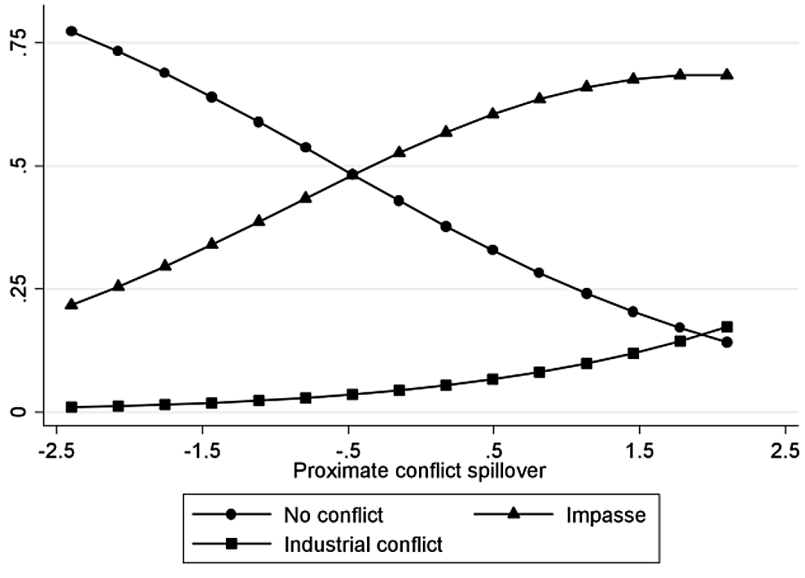

Figure 5.1 Predicted probabilities for the range of observed scores on the proximate conflict spillovers scale

Source: 2011 Dutch Negotiator Survey.

sectors increases, suggesting that spillover effects on conflict are not wholly sector-specific.

Hypothesis 3 predicts that any effect of spillovers on conflict should be greater for union than for firm negotiators. The interaction terms between the union negotiator dummy and the two spillover scales estimated to test this hypothesis however consistently failed to reach statistical significance throughout various potential model specifications. For reasons of space, these tests are not presented in Table 5.2. The two interaction models are reported in Appendix D, Table D6.

5.6 Conclusion and discussion

This study addressed the question how and under which conditions information about other bargaining events affects conflict in collective bargaining. It offers the first simultaneous investigation of mainstream and behavioral economic bargaining theoretic approaches, and sociological approaches to this question. The study further developed sociological theory to provide new insights into spillovers and conflict in contemporary labor relations. Using original data of negotiators in collective bargaining, unique direct measurements of spillovers and their impact on conflict were analyzed. In this way, effects predicted by the different approaches were critically tested.

No significant effect of spillovers referring to outcomes (e.g., wages) in other bargaining events was found. This suggests that neither the mechanisms described by economic rational learning, nor social comparisons theories by themselves adequately describe the influence of spillovers on conflict. As a caveat to this finding it must be noted that experimental research suggests that either mechanism may be behaviorally plausible depending on specific conditions (see Chapter 2 and Chapter 3), such that escalating and de-escalating spillovers could leave the average effect indeterminate.

Applying lessons from sociological diffusion theory, it was hypothesized that spillovers carrying information about conflict potential in other bargaining events leads to more conflict. Indeed substantial support for this proposition was found. The more negotiators are influenced by information about workers readiness for conflict and the potential success of conflict, the more likely it is that they experience conflicts in collective bargaining. Particularly spillovers from the past of the bargaining unit and within the same sector are associated with increased conflict. The effect thus appears to depend on the proximity of the information source, a pattern presumably related to perceptions of relevance.

Union negotiators are unequivocally influenced more by information about other bargaining events. However, the relationship between spillovers and conflict did not vary significantly between union and firm negotiators, indicating that spillovers can increase the probability of conflict for both types of negotiators. A potential explanation

for this finding is that both sides of the bargaining table may opt for conflict and both sides face similar uncertainties about the associated costs and benefits.

Diffusion theories offer valuable insights into labor conflict but must be adapted to account for contemporary labor relations, which are marked by (repeated) collective bargaining and relatively few overt conflicts. Finding weak correlations between observable conflict events may lead to the misleading conclusion that conflict in collective bargaining is not subject to social influences.

This study was constrained by the single-country, cross-sectional sample of modest size and by its reliance on retrospective data. A number of avenues for future research may be suggested. Incorporating questions measuring the influence of spillovers into country comparative questionnaire surveys of negotiators could yield important insights into the effects of spillovers in different institutional and economic contexts. The collection of matching employer-employee negotiators data offers the possibility to investigate how interactions of spillovers affects bargaining units. Given past challenges to the unitary actor assumption of union negotiators and employees (e.g. Ashenfelter and Johnson, 1969), the addition of matching employee data would allow to assess to impact of their principal-agent relationship. Moreover, as causality remains difficult to establish with cross-sectional data and panel data is costly and difficult to gather, studies of collective bargaining using pre- and post-measurements may prove invaluable. Alternatively, experiments offer a useful method to test the behavioural assumptions underlying theories of spillovers in a controlled environment. The combination of experimental insights with traditional econometric analyses and the use of qualitative and quantitative data gathered directly from negotiators promises a comprehensive understanding of the effects of spillovers in employment relations.

6

Conclusion and discussion

6.1 Introduction

Collective bargaining is influenced by information about other negotiations. These influences are known as 'information spillovers', or simply 'spillovers'. The effects of spillovers on bargaining outcomes, particularly on wages, have received extensive academic attention. Much less is known about the effects of spillovers on *conflict* in collective bargaining.

In the introduction, I described the three major theoretical approaches to labor conflict. Two of these approaches are based on economic bargaining theory. They have in common that they see conflict as fundamentally irrational because it imposes costs on both the employers' and the employees' side (cf. Hicks, 1932). The first approach assumes that negotiators act rationally, but conflicts arise because they suffer from information problems. I call this the mainstream economics approach. The second approach relaxes the rationality assumptions about negotiators' behavior, suggesting that conflicts arise due to reference-dependent preferences and cognitive biases. I call this the behavioral economics approach, which is based on (social) psychologically informed conceptions of action. The third approach is based on sociological theory. In contrast to the economic bargaining theoretic approaches, the sociological approach is based on the fundamentally Marxian assumption that conflict can actually be rational because its short-term cost can be outweighed by strategic, organizational and political gains. The extant relevant literature on spillovers and labor conflict has largely remained within the confines of one these approaches, leading to seemingly contradictory understandings of the relationship between spillovers and conflict. The different approaches invoke differing causal mechanisms for spillovers and offer differing predictions about the impact of spillovers on conflict in collective bargaining.

The aim of this thesis was to investigate whether, how and under what conditions spillovers lead to more or less conflict in collective bargaining. To contribute to this question, four specific research questions were formulated, which I addressed by implementing and analyzing bargaining experiments (Chapter 2 and Chapter 3) and by collecting and analyzing questionnaire survey data on collective bargaining negotiators in The Netherlands (Chapter 4 and Chapter 5). In the remainder of this chapter, I will summarize the findings and conclusions regarding the four specific research questions and then reflect on the overarching central research question. Subsequently, I will discuss some general scientific implications of the findings. This chapter ends with a discussion of the limitations of the studies presented in this book and an outline of directions for further research on spillovers and conflict in collective bargaining.

6.2 Summary: Research questions and findings

6.2.1 Experimental analyses of the behavioral assumptions of bargaining theoretic explanations for spillovers

In Chapter 2, I experimentally studied two theoretical mechanisms, social comparisons and rational learning, which have been proposed as explanations for spillovers across different bargaining units. I refer to these as horizontal spillovers. The first of these mechanisms, social comparison, is based on the assumption that negotiators' preferences are dependent on the observed bargaining outcomes of others. Negotiators are furthermore assumed to be subject to self-serving biases, such that they will only be influenced by the bargaining outcomes of others when these outcomes are favorable to themselves. Because negotiators in distributive bargaining have opposing aims, namely, maximizing their own earnings at the expense of other negotiators' earnings, the outcomes of others that are favorable for the negotiator on the employer side are unfavorable for the negotiator on the employee side and vice versa. Spillovers that result from such self-serving social comparisons should therefore increase the divergence between negotiators, leading to increased conflict. The second mechanism, rational learning, assumes that negotiators are influenced by the observed bargaining outcomes of others when there is asymmetric information about the firm's ability to pay and when the bargaining outcomes of others reveal new information about the firm's ability to pay. The rational learning mechanism suggests that information spillovers decrease information asymmetry about the firm's ability to pay. Because this information asymmetry is assumed to be the major source of conflict, spillovers resulting from rational learning should lead to less conflict. Thus, although the social comparison mechanism implies that spillovers increase conflict, the rational learning mechanism implies that spillovers decrease conflict. I therefore addressed the question of *how horizontal spillovers resulting from rational learning and social comparisons influence conflict in wage bargaining.*

To address this question, I implemented a two-person (i.e., union-firm player) bargaining experiment in which the firm player knew the amount of money that could be divided but the union player did not.[61] The experiment allowed negotiators to interactively bargain via proposals and counterproposals rather than reducing the bargaining process to a one-shot game, as has been common in previous research. Horizontal spillovers were incorporated by providing the participants with information about the bargaining outcomes of one other bargaining pair of participants. The two experimental treatments varied whether this information allowed for rational learning

61 This kind of asymmetric information is a necessary condition for the operation of the rational learning mechanism. It is also commonly accepted that this information asymmetry is a fundamental characteristic of wage bargaining (see Hayes, 1984; Kennan and Wilson, 1989; McConnell, 1989; Card, 1990; c.f. Cramton and Tracy, 2003; see also Hicks (1932: 139) and Marx ([1853]in Lapides 1987: 47).

or could only affect the players through social comparisons. Bargaining without information about other negotiations was used as a control condition.

The findings indicated that, as expected, horizontal spillovers due to social comparisons taken in isolation increase conflict in bargaining, with conflict measured by the divergence between the union player's and the firm player's proposal. Analyses of the proposals provided evidence that self-serving bias in the evaluation of information about the bargaining outcomes of others is predominantly notable among union players, which may be attributed to their lack of knowledge about the firm's ability to pay. In particular, the impact of information about the bargaining outcomes on the union players' proposals depended heavily on whether these outcomes were above or below the equal split of the expected amount of money to be divided. I also found that even though social comparisons increase conflict during bargaining, this conflict is greatly reduced through the interactive bargaining process itself, which serves to align union and firm proposals. This finding suggests that previous findings based on one-shot games may overstate the impact of social comparisons on conflict as measured by the failure to reach an agreement because their design does not allow for actual bargaining to take place. The findings further show that when rational learning becomes possible as an alternative mechanism for spillovers, the self-serving biases in the evaluation of the bargaining outcomes of others, as well as the conflict that results from these biases, are prevented altogether. When the players were informed that the bargaining outcomes of others occurred in negotiations in which the firm had an identical ability to pay, union proposals were linearly related to the value of the bargaining outcomes of others, increasing when the firm's ability to pay was higher and decreasing when it was lower. At the same time, making rational learning possible in this way did not decrease conflict below the level of the control treatment, in which no horizontal spillovers occurred. This finding suggests that the rational learning mechanism does not reduce conflict by itself as much as it prevents the conflict-increasing impact of social comparison.

In Chapter 3, I built upon the experimental design and findings presented in Chapter 2 to study the impact of spillovers within bargaining units over time, which I refer to as vertical spillovers. I first developed an integrated theoretical framework for studying the impact of both horizontal and vertical spillovers on conflict in bargaining based on economic bargaining theory. The framework distinguishes two mechanisms for horizontal spillovers, rational learning and social comparisons, and two mechanisms for vertical spillovers, reputation effects and expectation effects. The basic assumption underlying the rational learning and reputation effects mechanisms is that spillovers occur because they allow negotiators to reduce their uncertainty by learning about aspects of the negotiation that are subject to private information. For rational learning, the private information aspect is the employer's ability to pay, whereas for reputation effects, it is the employer's fairness. The basic assumption

underlying the social comparison and expectation effects mechanisms is that spillovers occur because they influence negotiators' preferences. It is argued that, by and large, mechanisms based on learning imply that spillovers decrease conflict, whereas mechanisms based on reference-dependent preferences imply that spillovers increase conflict. Using this framework, I addressed the question of *how vertical spillovers resulting from reputation effects and expectation effects influence conflict in wage bargaining.*

I addressed this question by introducing two new treatments to the experimental design analyzed in the previous chapter. These new treatments offered information identical to the two treatments analyzed in Chapter 2 but added information about the share of money earned by the firm players in their previous negotiation. This design allowed union players to assess the fairness of the firm players. In this way, I studied reputation effects. To study expectation effects, I analyzed the impact of past bargaining outcomes of the union negotiators on their subsequent negotiations.

A general insight resulting from the findings was that, as a rule of thumb, spillovers due to mechanisms that imply learning decrease conflict, whereas spillovers due to mechanisms that imply reference-dependent preferences increase conflict. However, the different mechanisms do not operate in isolation but can strengthen or weaken each other. For instance, I found that when firm players' fairness in previous negotiations was known to the union players, conflict decreased. Two processes help to explain this finding. Firm players who have agreed to outcomes more favorable to union players in previous negotiations gain 'good' reputations and face less conflict than do firm players who have been 'greedy' in previous negotiations. Moreover, when union players know that the firm player has been fair in previous negotiations, they are less likely to escalate their demands due to potential social comparisons across negotiations. Under conditions that make rational learning a feasible mechanism for horizontal spillovers, knowledge of fairness in previous negotiations is found to strengthen the association between the bargaining outcomes of others and union proposals. Regarding the impact of expectation effects, I found that conflict tends to increase with the value of the union players' earnings in previous negotiations, particularly when there is also information about the firm's fairness in previous negotiations.

6.2.2 Analyses of negotiator survey data

After experimentally testing the behavioral assumptions underlying bargaining theoretic explanations for spillovers in Chapter 2 and Chapter 3, I analyzed the impact of spillovers on bargaining behavior and subsequently on conflict in collective bargaining using questionnaire survey data (*Dutch Negotiator Survey 2011*) collected from collective bargaining negotiators. With these analyses, I investigated economic bargaining theoretic and sociological approaches to the relationship between spillovers and conflict in collective bargaining.

In Chapter 4, I studied the influence of various types of external information on negotiators involved in actual collective bargaining. Although assumptions about the proposed influence of external information on negotiators' bargaining behavior are abundant in bargaining theory, surprisingly little systematic empirical evidence for these influences has been gathered. I distinguished four general types of such external information: spillovers, information about the economic context, information about organizational power, and information about the institutional context. Each of these general types of external information was further divided into several specific types. I first addressed the descriptive question of *the extent to which negotiators in collective bargaining are influenced by different types of external information*. Previous work suggests that the influence of external information depends on certain characteristics of negotiators, bargaining units, and of the type of information. Hence, I also addressed the question of *the extent to which differences in the influence of external information between negotiators can be explained by the characteristics of the negotiators, bargaining units and the type of information.*

Theoretically, I proposed that negotiators typically face uncertainty, including uncertainty about their relative bargaining power, the employers' ability to pay, or what would constitute a fair outcome. External information influences negotiators because it allows them to reduce such uncertainties. Based on this assumption, I deduced a number of hypotheses about the influence of external information from several more specific theories and known empirical regularities.

The findings suggest that spillovers are very influential; negotiators report that information about other negotiations has a substantial impact on their bargaining behavior. This influence increases with the proximity of the source of the spillover. Information about past negotiations in the same bargaining unit has more influence than information about negotiations in other bargaining units in the same sector, which in turn has more influence than information about negotiations in other bargaining units in other sectors. My analyses indicate that information about the bargaining outcomes in other negotiations has more influence on negotiators' bargaining behavior than information about the willingness of employees to participate in industrial action and information about the success of industrial action in other negotiations. Generally, external information was found to have a greater influence on union negotiators than on firm negotiators, a pattern that is particularly pronounced for spillovers. Although I found modest evidence that the influence of some types of information increases with negotiating experience, this association was not found for spillovers. The findings further suggested that although the influence of most types of external information does not differ between company-level bargaining and sector-level bargaining, there is considerable evidence that spillovers play a larger role in company-level bargaining than in sector-level bargaining.

In Chapter 5, I investigated the influence of different types of information about other negotiations on the probability of bargaining conflicts. In this chapter, I evaluated

the implications of three main theoretical approaches to spillovers and conflict against data on collective bargaining using the *Dutch Negotiator Survey 2011*. The mainstream economic approach sees conflict as fundamentally irrational and resulting from the existence of asymmetric information about critical aspects of the negotiation. Spillovers are thought to occur because negotiators can use information about the outcomes of other negotiations to reduce their uncertainty about these private information aspects, such as through the rational learning mechanism. Because spillovers improve the information problems that cause conflict in the first place, they should largely decrease conflict in collective bargaining. In contrast, the behavioral economics approach is based on (social) psychologically informed assumptions about action. Spillovers are thought to occur because they allow negotiators to reduce uncertainty about what constitutes fair outcomes, implying that negotiators and/or the people they represent have reference-dependent preferences. Preferences are therefore affected by information about the outcomes of other negotiations, such as through the social comparison mechanism. The evaluation of such information is thought to be subject to cognitive biases. This implies that spillovers increase the divergence between the two sides of the bargaining table, leading to more conflict. Lastly, the sociological approach sees conflict as rational provided that the conditions favor beneficial outcomes to conflict. Consequently, the sociological literature argues that labor conflicts can inspire subsequent conflict, leading to a diffusion of conflict. However, this approach has thus far been applied only to historic contexts marked by highly unregulated labor relations. I further developed this sociological approach to make it applicable to present-day contexts, which are marked by institutionalized and largely pacified labor relations. I argued that conflict can be rational because it may yield benefits for either side, but it will always impose costs on either side as well. Negotiators will only opt for antagonistic bargaining strategies when they are sufficiently confident that the benefits of the conflict will outweigh its costs. Spillovers can occur because information about other negotiations can help to reduce uncertainty about the costs and benefits of conflict. I call this the sociological rational learning mechanism, in juxtaposition to the economic rational learning mechanism. In contrast to bargaining theoretic approaches to spillover, this mechanism implies that strategic information on conflict potential, rather than information about bargaining outcomes, is of crucial importance. Such information pertains to the willingness of employees to participate in industrial action and the success of industrial action. Given these three theoretical approaches, I addressed the question of *how and under what conditions information about other bargaining events influences the probability of negotiators experiencing conflicts in collective bargaining*.

The findings suggest that differences in the influence of information about bargaining outcomes in other negotiations are not related to the probability of conflict.

Thus, neither of the economic bargaining theoretic approaches by themselves offers a comprehensive explanation for the link between spillovers and conflict. A potential explanation for this finding is that spillovers may result from *both* learning about private information *and* reference-dependent preferences and may hence have opposing effects on conflict that leave the average effect ambiguous. However, I found strong evidence that negotiators who are more influenced by information about the willingness of employees to participate in industrial action and the success of industrial action are more likely to experience conflicts. This is especially the case when the sources of such information are sufficiently proximate, that is, when the information is derived from past negotiations of the bargaining unit or other bargaining units in the same sector. In Chapter 4, I found that such information tends to influence union negotiators more than firm negotiators. However, in Chapter 5, I found that the consequences of the influence for conflict do not differ between union and firm negotiators; the probability of conflict increases in the same measure with the influence of this information on either side of the bargaining table.

6.2.3 Answers to the central research question

Based on my findings for the specific research question, I will now briefly provide answers to the central research question that I aimed to address in this thesis. This central research question is as follows:

How and under what conditions do spillovers affect conflict in collective bargaining, and to what extent can different theoretical mechanisms account for this?

Spillovers occur because information about other negotiations allows negotiators to reduce their uncertainty about important aspects of the negotiation. The more proximate the source of the spillover is to a negotiation, the more influence it has. Moreover, the impact of spillovers is larger on union negotiators than on firm negotiators, and it is larger on negotiators in company-level bargaining than on negotiators in sector-level bargaining. Spillovers related to the outcomes of other negotiations can reduce negotiators' uncertainty about the fairness of potential outcomes. Such spillovers occur due to expectation effects and social comparisons and increase conflict. This escalating impact can be mitigated by mechanisms that result from negotiators' use of information about the outcomes of other negotiations to reduce their uncertainty about a firm's ability to pay and its fairness (i.e., (economic) rational learning and reputation effects), but these mechanisms can only operate when the information is known to be relevant to these two aspects. Lastly, spillovers also result from negotiators' use of information about the conflict potential of other negotiations to reduce their uncertainty about the costs and benefits of conflict in their own negotiation. Such spillovers cannot be adequately explained within the

economic bargaining theoretic approach, which emphasizes the cost (and hence the irrationality) of conflict, but they can be understood through the sociological approach, which emphasizes the benefits (and hence the potential rationality) of conflict. I referred to this as the sociological rational learning mechanism and found evidence that spillovers that occur through this mechanism lead to conflict in collective bargaining.

6.3 Theoretical contributions

Until now, spillovers have mostly been understood and studied from one of three main theoretical approaches. The drawback of such a strategy is that it has produced confusing and seemingly contradictory predictions and findings. Mainstream economics studies have suggested that spillovers decrease conflict, whereas behavioral economics and sociological studies have suggested that spillovers increase conflict, but for very different reasons.

The main contribution of this thesis is that it offers an initial systematic attempt to integrate these approaches and understand their contradictions. I showed that it is misleading to make wholesale conclusions about the relationship between spillovers and conflict without considering the multiple mechanisms through which they may operate that have been proposed by different approaches. Spillovers can both increase *and* decrease conflict depending on the mechanisms that cause them. These mechanisms can be distinguished by the aspect of the negotiation for which they allow negotiators to reduce uncertainty. My findings suggest that the role of any spillover mechanism depends on the relevance of information to these uncertain aspects of the negotiation, which varies between different sources and the specific informational content. The impact of spillovers particularly varies between union and firm negotiators and between negotiators in company-level bargaining and negotiators in sector-level bargaining. This finding indicates that the impact of spillovers increases with the level of uncertainty negotiators experience. I draw several general theoretical implications from these findings.

First, the findings regarding social comparisons and expectation effects reiterate that even though theoretical explanations based on strong rationality assumptions can adequately capture some aspects of empirical regularities in society, individual actors sometimes systematically deviate from these assumptions. My experimental analyses showed that negotiators base their demands on their own past earnings and the earnings of others, regardless of whether these earnings offer any rationally valuable information to them. Moreover, the influence of the earnings of others on negotiators is, in some conditions, determined by self-serving biases that defy strong rationality assumptions.

Second, rational choice approaches can lead to vastly different explanations and predictions based on their definition of the action problem. This became evident from the contrast in my findings between what I termed economic and sociological rational learning, which result from different conceptions of the rationality of labor conflict between the disciplines.

Third, sociological diffusion theory, at its core, argues that actors become more likely to exhibit a certain behavior when they have information about others having exhibited this behavior. My analyses of spillovers suggest that information about others can affect behavior through multiple and potentially counteracting causal mechanisms. This may imply that current conceptions of diffusion theory may be not be able to sufficiently address empirical contexts that are similarly marked by multiple potential patterns of influence. In such contexts, careful a priori considerations of potentially counteracting mechanisms and the conditions under which they operate would be necessary.

6.4 Limitations and suggestions for further research

Despite the long-standing tacit understanding that conflict in collective bargaining is affected by spillovers, scientific studies of this relationship have been few and far between. A contributing factor to the relative infancy of this field can be found in the extensive methodological challenges associated with adequately identifying spillover effects, particularly from commonly available observational bargaining unit-, industry-, and country-level data. Thus, the best way to study spillovers remains an open question. I have addressed this question by focusing on individual negotiators, their bargaining behavior, and its consequences for conflict. I conducted bargaining experiments and collected questionnaire survey data. The experiments allowed me to isolate spillover effects and study the plausibility of their behavioral assumptions. The survey allowed me to observe the impact of various spillovers at the nexus where they occur: the negotiators. There are, however, limitations to my methodological approach. I have presented specific limitations and related suggestions for further research at the end of each empirical chapter. Here, I will present more general remarks about the limitations of my analyses and promising avenues for further research.

Bargaining experiments offer high control at the expense of limitations to external validity due to reliance on highly simplified representations of bargaining and the assumption that what holds for students in small-stakes bargaining will also hold for negotiators in actual wage bargaining. The experiments I conducted, which used more realistic unstructured bargaining, suggested that previous experimental studies based on highly simplified one-shot games may have yielded partially biased results.

The external validity of various bargaining structures, subjects and payments used in experimental studies should be subject to continued scrutiny. The experiments presented in Chapter 2 pointed to the importance of initial focal points relative to which the outcomes of others are evaluated through social comparisons. In the experiments, this focal point was given by the 50-50 split of the expected surplus, but it is not obvious what its equivalent would be in real wage bargaining. However, it is plausible that such focal points exist, and future research should work toward identifying them. Negotiator surveys may prove helpful in this respect.

Different bargaining events may affect each other in more ways than via the direct influence of information studied in this thesis, such as by changing the economic context in which other negotiations take place. Furthermore, explicit coordination between trade unions, between employers, and across different levels of bargaining centralization may occur, creating additional interdependencies between negotiations. Further research is needed to arrive at an integrated understanding of these interdependencies and how they influence conflict in collective bargaining.

Throughout this thesis, I have worked under the assumption that negotiators and the individuals they represent can be treated as unitary actors. This assumption may not always hold (cf. Ross, 1948; Ashenfelter and Johnson, 1969), implying a need for future research on the way that spillovers are affected by potentially mediating and moderating relationships between the preferences of individuals and the preferences of negotiators. Moreover, given the context of declining unionization, it will become increasingly important to understand the mechanisms and impact of spillovers on conflict when workers bargain individually and/or through works councils. Under such conditions, the available sources of information about other negotiations and the strategic relevance of this information may be very different than under traditional union-led bargaining.

Finally, it should be noted that with increasing political and economic integration, collective bargaining is becoming progressively embedded in an international context. Thus, it will be important to understand whether and how spillovers operate across borders and what consequences cross-border spillovers have for conflict in collective bargaining.

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Appendix A1

A1.1 Instructions CONTROL condition

EXPERIMENT INSTRUCTIONS

Introduction:

You will now participate in an experiment on economic decision–making. The experiment will last approximately 1.5 hours.

In the experiment, you will collect points. At the end of the experiment you will be paid for all the points you have earned. For your participation, you will receive 3 Euro. Additionally, you can earn points during the experiment. How much you will earn crucially depends on the points you earn by your decisions in the experiment. No other experiment participant will learn how much you earned.

The exchange rate is: 100 points = 6 Euro, 1 point = 6 Euro-cent.

You are not allowed to talk to other participants or use any electronic communication device, such as your cell phone, from now on. Disobeying this rule will result in your exclusion from the experiment and loss of any points you have earned.

Description box

In this experiment, you will participate in 15 rounds of interaction.
At the start of the experiment, you will be assigned a role. You can become either a PLAYER A or a PLAYER B. You will stay in the same role for all 15 rounds of the interaction and will interact with a **different** participant in the other role in each round.

In each round, you and the other participant will have to agree on how to divide a certain number of points. This number will be 24 points **plus** an additional number of points. The number of additional points can be different in each round and can be any even number between -12 and +12. That means that the additional points can be any of the following numbers: {-12,-10,-8,-6,-4,-2,0,2,4,6,8,10,12}. **Only PLAYER A will learn the number of additional points in each round**.

IMPORTANT: Note that the additional points **can be a negative number**, so that the total number of points at the start of each round can be as low as 24 – 12 = 12 points; but also as high as 24 + 12 = 36 points!

At the start of each round, PLAYER A learns the number of additional points. After this, PLAYER B can propose any number between 0 and 36 as the PROPOSAL. The PROPOSAL is the number of points that PLAYER B proposes to earn at the end of the round, so that PLAYER A will earn the rest of the points. After PLAYER B's initial PROPOSAL, PLAYER A and PLAYER B will have 1 minute to reach an agreement on the PROPOSAL.

During this period of 1 minute, **both** PLAYER A and PLAYER B can propose any number between 0 and 36 as the PROPOSAL, and change the PROPOSAL at any time within the 1 minute. PLAYER A and PLAYER B both can at any moment ACCEPT the most recent PROPOSAL **made by the other person**. Thus an agreement is reached if
- either PLAYER A accepts some PROPOSAL made by PLAYER B
- or PLAYER B accepts some PROPOSAL made by PLAYER A.

As soon as a PROPOSAL is ACCEPTED, the round of interaction is finished and the earnings for that round will be as follows:

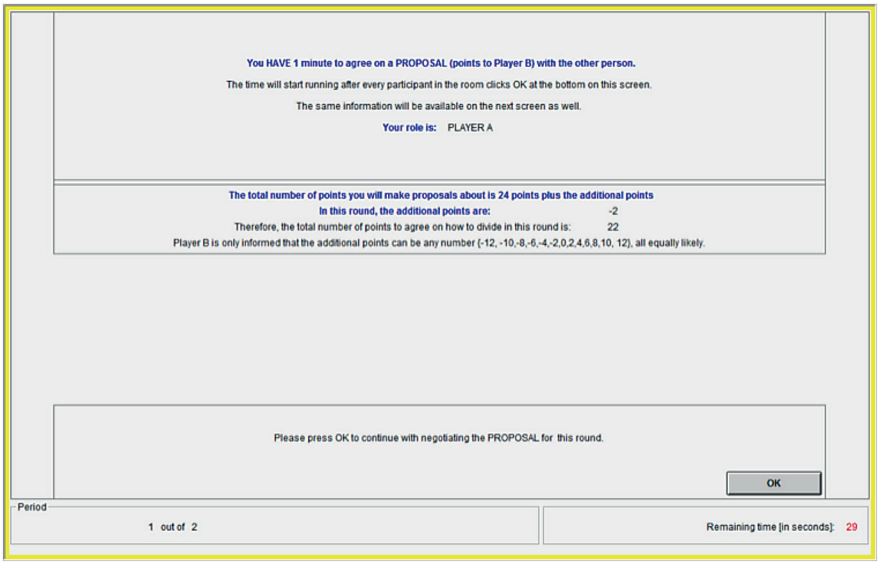
PLAYER A's earnings = [24 points **plus** the additional points] **minus** the number of points agreed on for the PROPOSAL
PLAYER B's earnings = the number of points agreed on for the PROPOSAL

IMPORTANT: If no PROPOSAL is ACCEPTED within the 1 minute, PLAYER A and PLAYER B will both earn 0 points in that round.

After all participants in the room have finished their interactions you will learn how many points you have earned in this round. Then the next round will start.

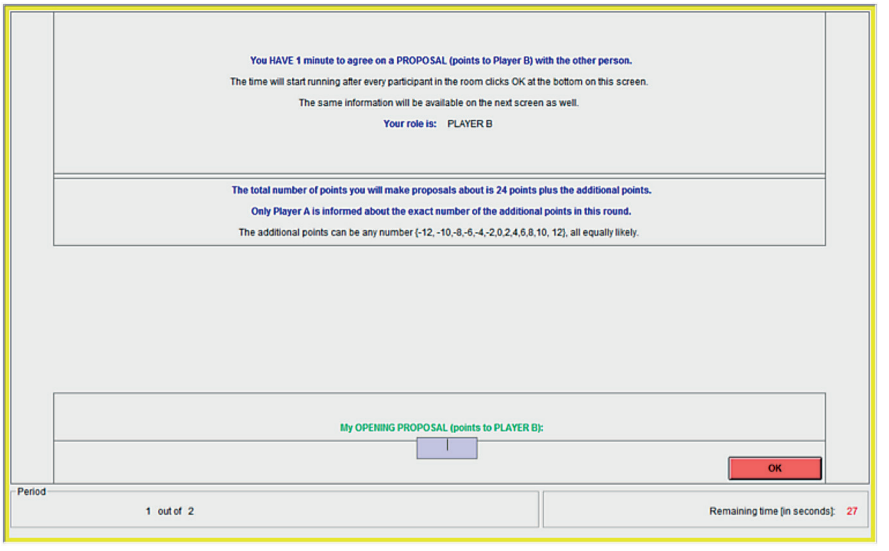
Let us now explain what the computer screens look like.

SCREEN 1 PLAYER A



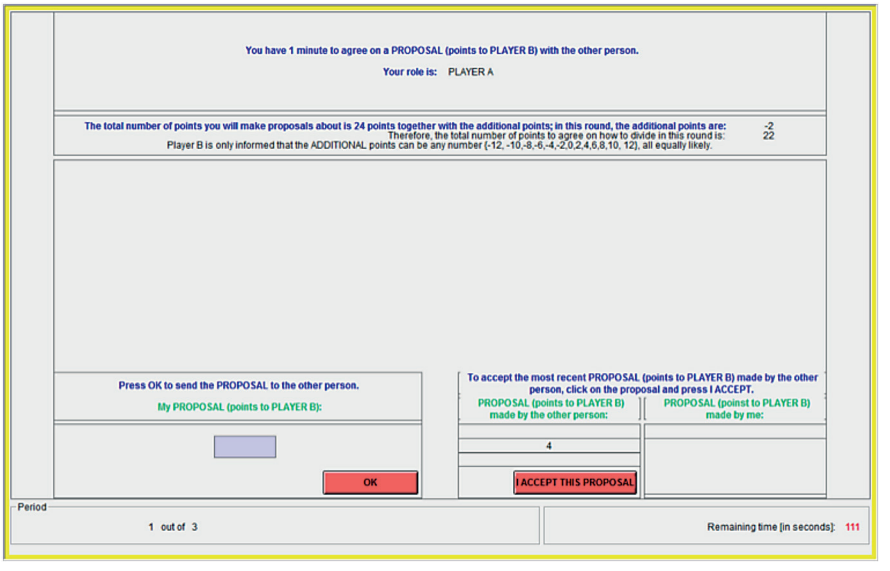
You will only see this screen if your role is PLAYER A. At the top of this screen, you will learn about the additional number of points in this round. After you have learned the additional number of points, press OK to continue. The information presented in the top part of screen will also be available to you on the next screen.

SCREEN 1 PLAYER B

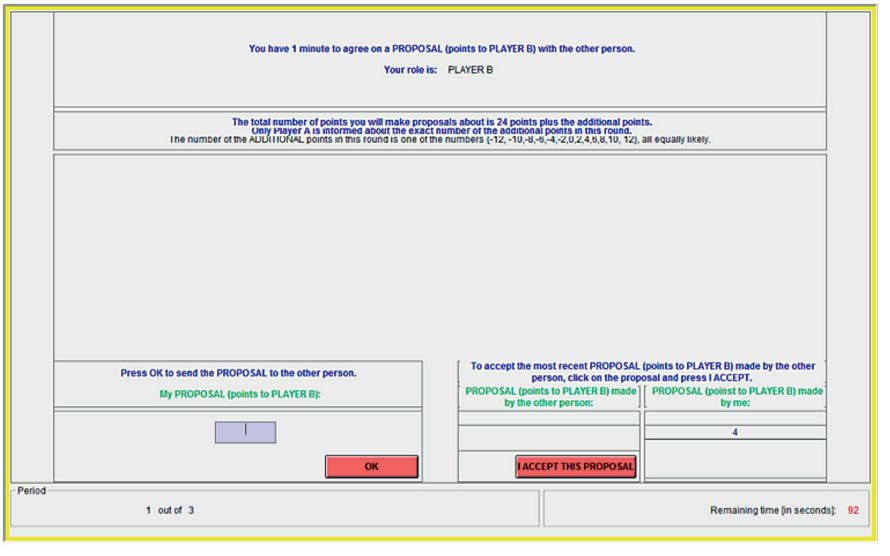


You will only see this screen if your role is PLAYER B. At the top of this screen, you will see some information about the number of points in this round. This information will also be available to you on the next screen. In the lower center part of this screen, you can make your initial OPENING PROPOSAL. Type in a number between 0 and 36 and press OK to send your OPENING PROPOSAL to the other person. After that, you will be taken to the next screen where you will have 1 minute to reach an agreement on the PROPOSAL with the other person.

SCREEN 2 PLAYER A (NEGOTIATION SCREEN)



SCREEN 2 PLAYER B (NEGOTIATION SCREEN)



NEGOTIATION SCREENS

In this screen, PLAYER A and PLAYER B will be able to make a PROPOSAL or accept the most recent PROPOSAL by the other person within the period of 1 minute. The screen is divided into different parts.

At the top of the screen, the same information as in SCREEN 1 about the number of points in the current round are shown.

In the LOWER LEFT part, you will be able to make a PROPOSAL. Type in any number between 0 and 36 and press OK. Your PROPOSAL will appear on the screen of the person you are matched to.

The LOWER RIGHT part is divided into two sections. To the left, you can observe the PROPOSALS made by the other person. **Important:** If you would like to accept the most recent PROPOSAL of the other person, **first select** the PROPOSAL by clicking on it, then click on I ACCEPT THIS PROPOSAL. To the right, you can see the PROPOSALS you have send to the other person.

As soon as you or the other person accepts a PROPOSAL, this PROPOSAL will determine your earnings in this round. If no PROPOSAL was accepted within one minute, you will earn 0 points.

The experiment now starts with a short test to make sure that everybody understands how points are earned. After all experiment participants answered all questions correctly, we will first start two trial rounds of interaction to insure that everybody understands the how the screens work. These two rounds will not add to your earnings. After the trial rounds, the 15 rounds of interaction that determine your earnings will start.

Please start by answering the following questions.

TEST QUESTIONS:

Please write down your answers!

1) Suppose that the additional number of points is -6 and the PROPOSAL that PLAYER A and PLAYER B agree on is 10.
   - o How many points did PLAYER A earn?
   - o How many points did PLAYER B earn?

2) Suppose that the additional number of points +6 and the PROPOSAL that PLAYER A and PLAYER B agree on is 10.
   - o How many points did the PLAYER A earn?
   - o How many points did the PLAYER B earn?

3) Suppose that the additional number of points is 0; and the PROPOSAL that PLAYER A and PLAYER B agree on is 30.
   - o How many points did the PLAYER A earn?
   - o How many points did the PLAYER B earn?

4) Suppose that the both PLAYER A and PLAYER B did not accept any PROPOSAL within 1 minute.
   - o How many points did the PLAYER A earn?
   - o How many points did the PLAYER B earn?

5) Suppose your role is PLAYER A. Which of the following statements is true?
   - o You will be negotiating with the same person in the role of PLAYER B in all rounds
   - o You will be randomly assigned to negotiate with one of the persons with the role of PLAYER B in each round

6) Suppose your role is PLAYER B. Which of the following statements is true?
   - o You will be negotiating with the same person in the role of PLAYER A in all rounds
   - o You will be randomly assigned to negotiate with one of the persons with the role of PLAYER A in each round

Please wait for us to check your answers.

A1.2 Instructions CORRELATED and UNCORRELATED treatments

EXPERIMENT INSTRUCTIONS

Introduction:

You will now participate in an experiment on economic decision–making. The experiment will last approximately 1.5 hours.

In the experiment, you will collect points. At the end of the experiment you will be paid for all the points you have earned. For your participation, you will receive 3 Euro. Additionally, you can earn points during the experiment. How much you will earn crucially depends on the points you earn by your decisions in the experiment. No other experiment participant will learn how much you earned.

The exchange rate is: 100 points = 6 Euro, 1 point = 6 Euro-cent.

You are not allowed to talk to other participants or use any electronic communication device, such as your cell phone, from now on. Disobeying this rule will result in your exclusion from the experiment and loss of any points you have earned.

Description box

In this experiment, you will participate in 15 rounds of interaction.
At the start of the experiment, you will be assigned a role. You can become either a PLAYER A or a PLAYER B. You will stay in the same role for all 15 rounds of the interaction and will interact with a **different** participant in the other role in each round.

In each round, you and the other participant will have to agree on how to divide a certain number of points. This number will be 24 points **plus** an additional number of points. The number of additional points can be different in each round and can be any even number between -12 and +12. That means that the additional points can be any of the following numbers: {-12,-10,-8,-6,-4,-2,0,2,4,6,8,10,12}. **Only PLAYER A will learn the number of additional points in each round**.

IMPORTANT: Note that the additional points **can be a negative number**, so that the total number of points at the start of each round can be as low as 24 – 12 = 12 points; but also as high as 24 + 12 = 36 points!

At the start of each round, PLAYER A learns the number of additional points. After this, PLAYER B can propose any number between 0 and 36 as the PROPOSAL. The PROPOSAL is the number of points that PLAYER B proposes to earn at the end of the round, so that PLAYER A will earn the rest of the points. After PLAYER B's initial PROPOSAL, PLAYER A and PLAYER B will have 1 minute to reach an agreement on the PROPOSAL.

During this period of 1 minute, **both** PLAYER A and PLAYER B can propose any number between 0 and 36 as the PROPOSAL, and change the PROPOSAL at any time within the 1 minute. PLAYER A and PLAYER B both can at any moment ACCEPT the most recent PROPOSAL **made by the other person**. Thus an agreement is reached if
- either PLAYER A accepts some PROPOSAL made by PLAYER B
- or PLAYER B accepts some PROPOSAL made by PLAYER A.

As soon as a PROPOSAL is ACCEPTED, the round of interaction is finished and the earnings for that round will be as follows:

PLAYER A's earnings = [24 points **plus** the additional points] **minus** the number of points agreed on for the PROPOSAL
PLAYER B's earnings = the number of points agreed on for the PROPOSAL

IMPORTANT: If no PROPOSAL is ACCEPTED within the 1 minute, PLAYER A and PLAYER B will both earn 0 points in that round.

After all participants in the room have finished their interactions you will learn how many points you have earned in this round. Then, the next round will start.

ADDITIONAL INFORMATION ON THE COMPUTER SCREEN:

During each round, some information will appear on your screen. The same type of information will be available to you in all rounds.

Information type 1
For our research, we conduct experimental sessions on several days. In each session, the participants engage in exactly the same interactions as explained in the Description box and as you will engage in now. Points are worth exactly as much in all other sessions as in the current session, and the participants in the other sessions are also students.

In the UPPER LEFT part of the screen, we will display information about **one** other negotiation by some other PLAYER A and PLAYER B pair in one of these other sessions.
You will learn the PROPOSAL agreed to in that negotiation (= the number of points earned by the PLAYER B in that negotiation). In case there was no agreement in that negotiation, you will learn that there was NO AGREEMENT.

In each round, this information will be about a different negotiation of a different PLAYER A and PLAYER B pair.

This information will be made available to you in all rounds.

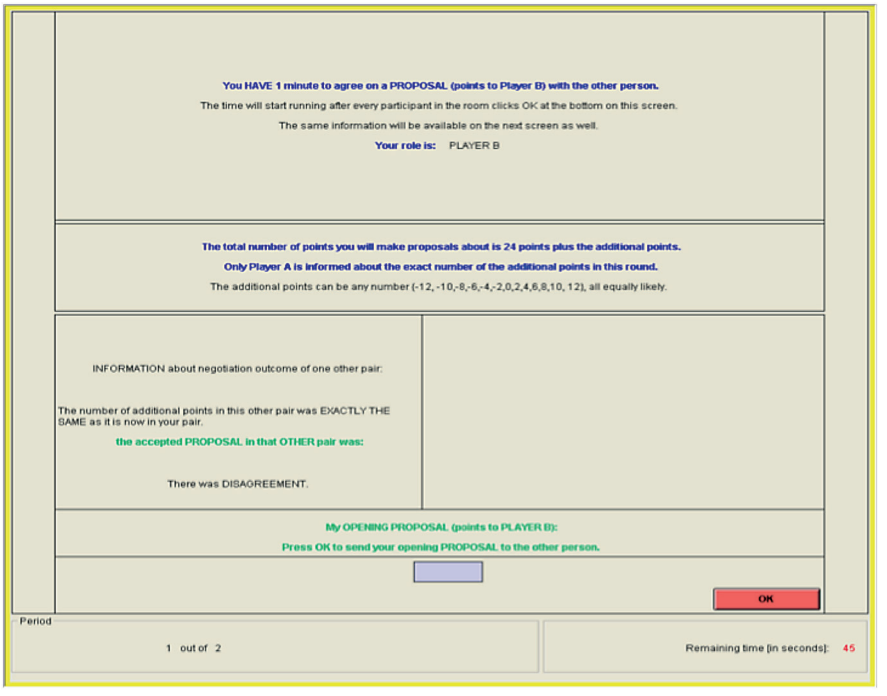
Important: The **additional number of points** in this other negotiation was **either exactly the same** as the number of additional points in your current round **or one of any of the possible number of additional points** (any even number between –12 and +12). You will learn which one of these two cases apply by looking at the UPPER LEFT part of the screen.

Let us now explain what the computer screens look like.

SCREEN 1 PLAYER A

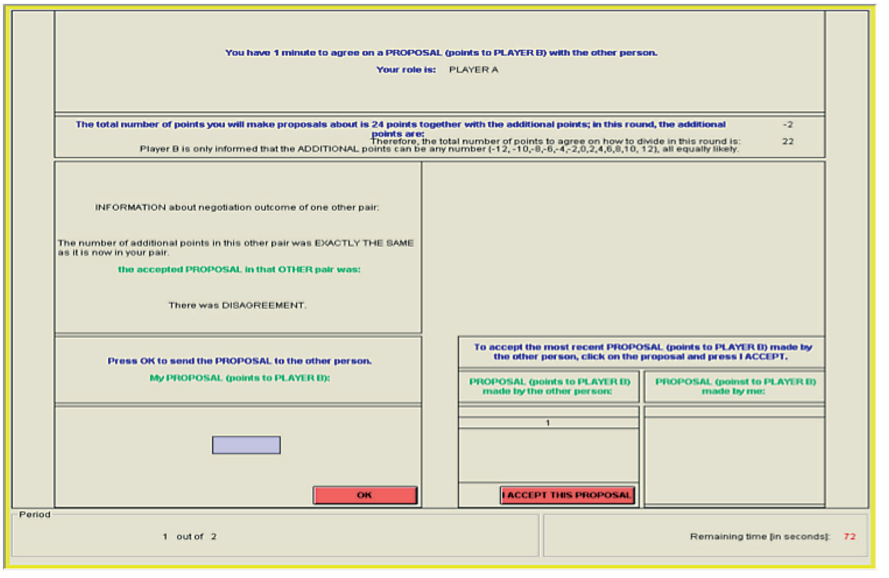
You will only see this screen if your role is PLAYER A. At the top of this screen, you will learn about the additional number of points in this round. After you have learned the additional number of points, press OK to continue. The information presented in the top part of screen will also be available to you on the next screen.

SCREEN 1 PLAYER B

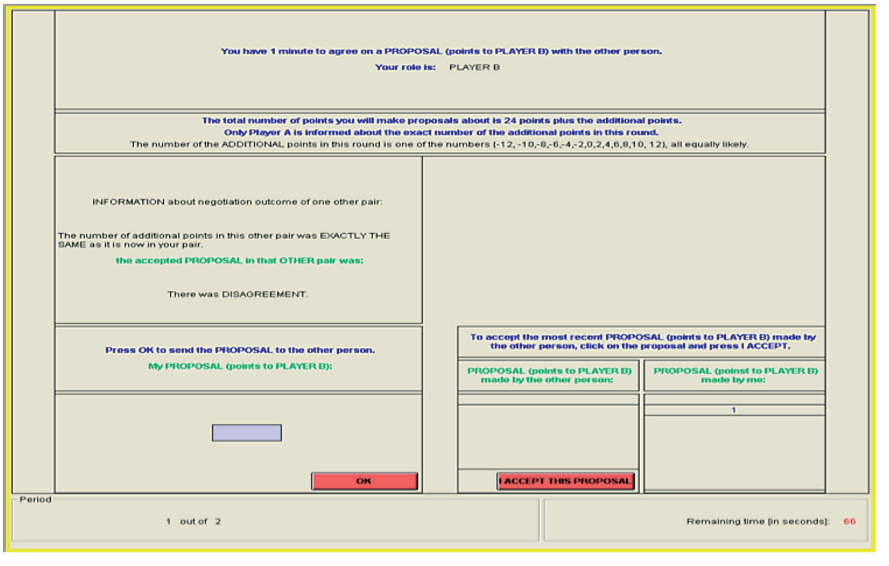


You will only see this screen if your role is PLAYER B. At the top of this screen, you will see some information about the number of points in this round. This information will also be available to you on the next screen. In the lower center part of this screen, you can make your initial OPENING PROPOSAL. Type in a number between 0 and 36 and press OK to send your OPENING PROPOSAL to the other person. After that, you will be taken to the next screen where you will have 1 minute to reach an agreement on the PROPOSAL with the other person.

SCREEN 2 PLAYER A (NEGOTIATION SCREEN)



SCREEN 2 PLAYER B (NEGOTIATION SCREEN)



NEGOTIATION SCREENS

In this screen, PLAYER A and PLAYER B will be able to make a PROPOSAL or accept the most recent PROPOSAL by the other person within the period of 1 minute. The screen is divided into different parts.

At the top of the screen, the same information as in SCREEN 1 about the number of points in the current round are shown.

In the LOWER LEFT part, you will be able to make a PROPOSAL. Type in any number between 0 and 36 and press OK. Your PROPOSAL will appear on the screen of the person you are matched to.

The LOWER RIGHT part is divided into two sections. To the left, you can observe the PROPOSALS made by the other person. **Very important!:** If you would like to accept the most recent PROPOSAL of the other person, **first select the PROPOSAL by clicking on it**, **then click on I ACCEPT THIS PROPOSAL**. To the right, you can see the PROPOSALS you have send to the other person.

As soon as you or the other person accepts a PROPOSAL, this PROPOSAL will determine your earnings in this round. If no PROPOSAL was accepted within one minute, you will earn 0 points.

In the UPPER LEFT part, you find additional information about one other PROPOSAL agreed upon in a previous round by one of the other PLAYER A and PLAYER B pairs. That means, you will thus learn the number of points earned by one PLAYER B in a previous round. In case there was no agreement between that pair, you will learn that there was NO AGREEMENT.

Important: in each round any pair of a PLAYER A and a PLAYER B will see the same screen. However, only PLAYER A will know the additional number of points in that round.

The experiment now starts with a short test to make sure that everybody understands how points are earned. After all experiment participants answered all questions correctly, we will first start two trial rounds of interaction to insure that everybody understands how the screens work. These two rounds will not add to your earnings. After the trial rounds, the 15 rounds of interaction that determine your earnings will start.

Please start by answering the following questions.

TEST QUESTIONS:

Please write down your answers!

1) Suppose that the additional number of points is -6 and the PROPOSAL that PLAYER A and PLAYER B agree on is 10.
   - o How many points did PLAYER A earn?
   - o How many points did PLAYER B earn?

2) Suppose that the additional number of points +6 and the PROPOSAL that PLAYER A and PLAYER B agree on is 10.
   - o How many points did the PLAYER A earn?
   - o How many points did the PLAYER B earn?

3) Suppose that the additional number of points is 0; and the PROPOSAL that PLAYER A and PLAYER B agree on is 30.
   - o How many points did the PLAYER A earn?
   - o How many points did the PLAYER B earn?

4) Suppose that the both PLAYER A and PLAYER B did not accept any PROPOSAL within 1 minute.
   - o How many points did the PLAYER A earn?
   - o How many points did the PLAYER B earn?

5) Suppose you see a PROPOSAL agreed to by another PLAYER A and PLAYER B pair in the previous round. Will you be able to tell if the additional number of points in that negotiation was either a) exactly the same as the additional number of points in your current negotiation or b) if it was one of any even number between -12 and +12.
   - o No
   - o Yes, by looking at the LOWER LEFT part of the screen
   - o Yes, by looking at the UPPER LEFT part of the screen
   - o Yes, by looking at the UPPER RIGHT part of the screen

6) Suppose your role is PLAYER A. Which of the following statements is true?
   - o You will be negotiating with the same person in the role of PLAYER B in all rounds
   - o You will be randomly assigned to negotiate with one of the persons with the role of PLAYER B in each round

7) Suppose your role is PLAYER B. Which of the following statements is true?
   - o You will be negotiating with the same person in the role of PLAYER A in all rounds
   - o You will be randomly assigned to negotiate with one of the persons with the role of PLAYER A in each round

Please wait for us to check your answers.

A1.3 Instructions CORRELATED/REPUTATION and UNCORRELATED/REPUTATION condition treatments

EXPERIMENT INSTRUCTIONS

Introduction:

You will now participate in an experiment on economic decision–making. The experiment will last approximately 1.5 hours.

In the experiment, you will collect points. At the end of the experiment you will be paid for all the points you have earned. For your participation, you will receive 3 Euro. Additionally, you can earn points during the experiment. How much you will earn crucially depends on the points you earn by your decisions in the experiment. No other experiment participant will learn how much you earned.

The exchange rate is: 100 points = 6 Euro, 1 point = 6 Euro-cent.

You are not allowed to talk to other participants or use any electronic communication device, such as your cell phone, from now on. Disobeying this rule will result in your exclusion from the experiment and loss of any points you have earned.

Description box

In this experiment, you will participate in 15 rounds of interaction.
At the start of the experiment, you will be assigned a role. You can become either a PLAYER A or a PLAYER B. You will stay in the same role for all 15 rounds of the interaction and will interact with a **different** participant in the other role in each round.

In each round, you and the other participant will have to agree on how to divide a certain number of points. This number will be 24 points **plus** an additional number of points. The number of additional points can be different in each round and can be any even number between -12 and +12. That means that the additional points can be any of the following numbers: {-12,-10,-8,-6,-4,-2,0,2,4,6,8,10,12}. **Only PLAYER A will learn the number of additional points in each round**.

IMPORTANT: Note that the additional points **can be a negative number**, so that the total number of points at the start of each round can be as low as 24 – 12 = 12 points; but also as high as 24 + 12 = 36 points!

At the start of each round, PLAYER A learns the number of additional points. After this, PLAYER B can propose any number between 0 and 36 as the PROPOSAL. The PROPOSAL is the number of points that PLAYER B proposes to earn at the end of the round, so that PLAYER A will earn the rest of the points. After PLAYER B's initial PROPOSAL, PLAYER A and PLAYER B will have 1 minute to reach an agreement on the PROPOSAL.

During this period of 1 minute, **both** PLAYER A and PLAYER B can propose any number between 0 and 36 as the PROPOSAL, and change the PROPOSAL at any time within the 1 minute. PLAYER A and PLAYER B both can at any moment ACCEPT the most recent PROPOSAL **made by the other person**. Thus an agreement is reached if
- either PLAYER A accepts some PROPOSAL made by PLAYER B
- or PLAYER B accepts some PROPOSAL made by PLAYER A.

As soon as a PROPOSAL is ACCEPTED, the round of interaction is finished and the earnings for that round will be as follows:

PLAYER A's earnings = [24 points **plus** the additional points] **minus** the number of points agreed on for the PROPOSAL
PLAYER B's earnings = the number of points agreed on for the PROPOSAL

IMPORTANT: If no PROPOSAL is ACCEPTED within the 1 minute, PLAYER A and PLAYER B will both earn 0 points in that round.

After all participants in the room have finished their interactions you will learn how many points you have earned in this round. Then the next round will start.

ADDITIONAL INFORMATION ON THE COMPUTER SCREEN:

During each round, some information will appear on your screen. The same type of information will be available to you in all rounds, except for the first round.

Information type 1

For our research, we conduct experimental sessions on several days. In each session, the participants engage in exactly the same interactions as explained in the Description box and as you will engage in now. Points are worth exactly as much in all other sessions as in the current session, and the participants in the other sessions are also students.

In the UPPER LEFT part of the screen, we will display information about **one** other negotiation by some other PLAYER A and PLAYER B pair in one of these other sessions.
You will learn the PROPOSAL agreed to in that negotiation (= the number of points earned by the PLAYER B in that negotiation). In case there was no agreement in that negotiation, you will learn that there was NO AGREEMENT.

In each round, this information will be about a different negotiation of a different PLAYER A and PLAYER B pair.

This information will be made available to you in all rounds.

Important: The **additional number of points** in this other negotiation was **either exactly the same** as the number of additional points in your current round **or one of any of the possible number of additional points** (any even number between –12 and +12). You will learn which one of these two cases apply by looking at the UPPER LEFT part of the screen.

Information type 2

In the UPPER RIGHT part of the computer screen, we will display information about the PERCENTAGE of the total number of points that the current PLAYER A earned in the previous period. This PERCENTAGE is the number of points earned by the current PLAYER A in the last round (24 points **plus** the additional points **minus** the number of points agreed on for the PROPOSAL) **divided** by (24 points **plus** the additional points)

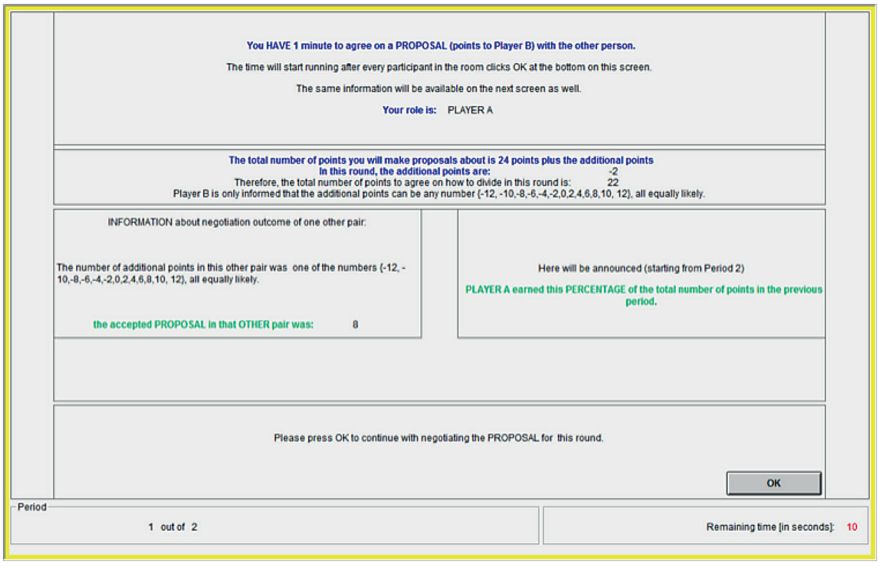
For example, if in PLAYER A's previous round the additional number of points was -2 and the PROPOSAL agreed to in that round was 8; then the current PLAYER A earned 24-2-8=14 points. The total number of points at the start of that round was of 24-2=22 points, making current PLAYER A's earned PERCENTAGE 14/22=64%. In that case, 64% will appear in the UPPER RIGHT part of the screen.

Therefore, if your role is PLAYER A, the PERCENTAGE of the total points you earned in any round will be known to the PLAYER B in your next round. If your role is PLAYER B, the PERCENTAGE of the total points that the current PLAYER A earned in the previous round will be known to you.

Because this information is about previous rounds, it will appear for the first time in ROUND 2 and then be made available to you for each of the following rounds.

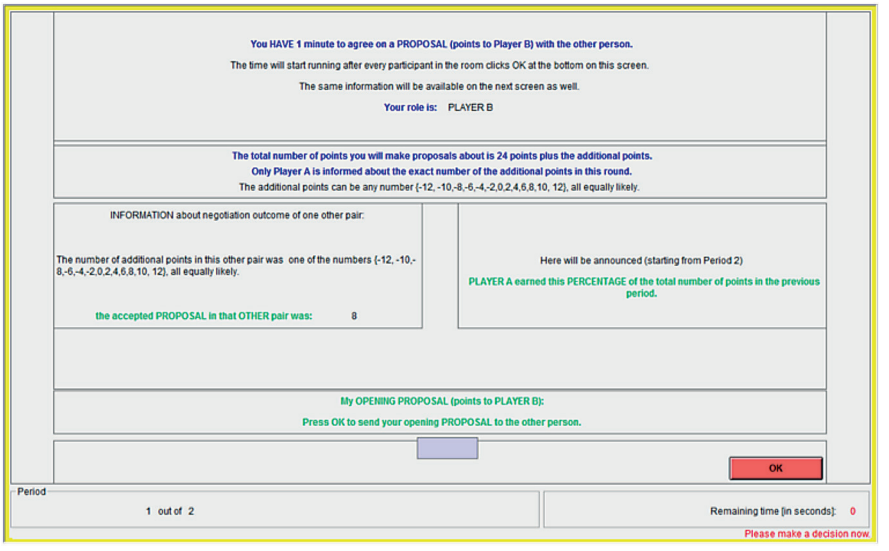
Let us now explain what the computer screens look like.

SCREEN 1 PLAYER A



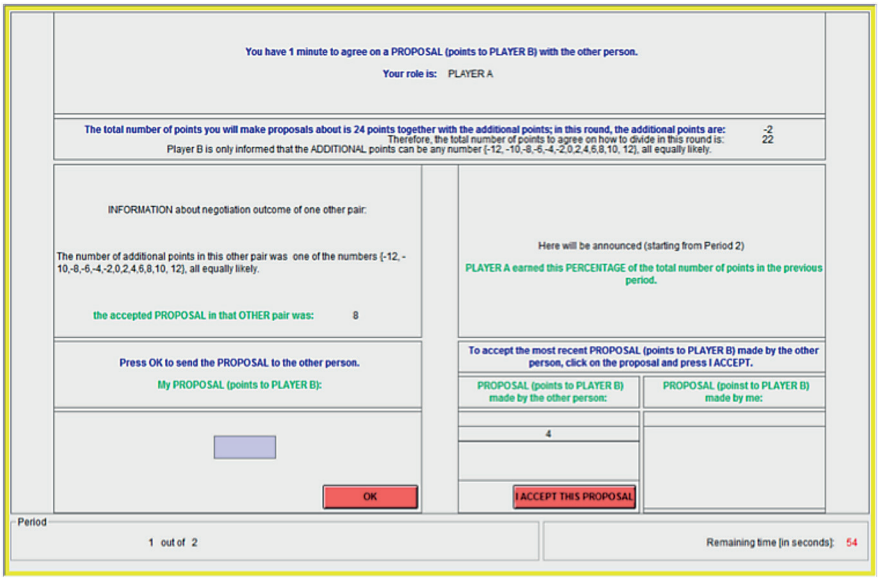
You will only see this screen if your role is PLAYER A. At the top of this screen, you will learn about the additional number of points in this round. After you have learned the additional number of points, press OK to continue. The information presented in the top part of screen will also be available to you on the next screen.

SCREEN 1 PLAYER B

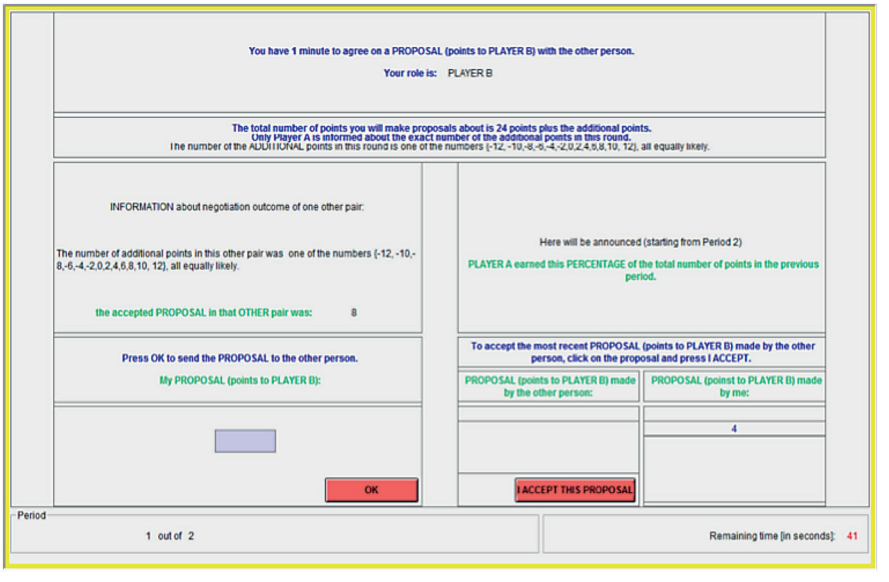


You will only see this screen if your role is PLAYER B. At the top of this screen, you will see some information about the number of points in this round. This information will also be available to you on the next screen. In the lower center part of this screen, you can make your initial OPENING PROPOSAL. Type in a number between 0 and 36 and press OK to send your OPENING PROPOSAL to the other person. After that, you will be taken to the next screen where you will have 1 minute to reach an agreement on the PROPOSAL with the other person.

SCREEN 2 PLAYER A (NEGOTIATION SCREEN)



SCREEN 2 PLAYER B (NEGOTIATION SCREEN)



NEGOTIATION SCREENS

In this screen, PLAYER A and PLAYER B will be able to make a PROPOSAL or accept the most recent PROPOSAL by the other person within the period of 1 minute. The screen is divided into different parts.

At the top of the screen, the same information as in SCREEN 1 about the number of points in the current round are shown.

In the LOWER LEFT part, you will be able to make a PROPOSAL. Type in any number between 0 and 36 and press OK. Your PROPOSAL will appear on the screen of the person you are matched to.

The LOWER RIGHT part is divided into two sections. To the left, you can observe the PROPOSALS made by the other person. **Very important!:** If you would like to accept the most recent PROPOSAL of the other person, **first select the PROPOSAL by clicking on it, then click on I ACCEPT THIS PROPOSAL**. To the right, you can see the PROPOSALS you have send to the other person.

As soon as you or the other person accepts a PROPOSAL, this PROPOSAL will determine your earnings in this round. If no PROPOSAL was accepted within one minute, you will earn 0 points.

In the UPPER LEFT part, you find additional information about one other PROPOSAL agreed upon in a previous session by one of the other PLAYER A and PLAYER B pairs. That means, you will thus learn the number of points earned by one PLAYER B in one round in one of the previous sessions. In case there was no agreement between that pair, you will learn that there was NO AGREEMENT.

In the UPPER RIGHT part, we will display information about the PERCENTAGE of the total points that PLAYER A earned in the previous round.

Because this information is about previous rounds, it will appear for the first time in ROUND 2 and then be made available to you for each of the following rounds.

Important: in each round any pair of a PLAYER A and a PLAYER B will see the same negotiation screen. However, only PLAYER A will know the additional number of points in that round.

The experiment now starts with a short test to make sure that everybody understands how points are earned. After all experiment participants answered all questions correctly, we will first start two trial rounds of interaction to insure that everybody understands how the screens work. These two rounds will not add to your earnings. After the trial rounds, the 15 rounds of interaction that determine your earnings will start.

Please start by answering the following questions.

TEST QUESTIONS:

Please write down your answers!

1) Suppose that the additional number of points is -6 and the PROPOSAL that PLAYER A and PLAYER B agree on is 10.
   - o How many points did PLAYER A earn?
   - o How many points did PLAYER B earn?

2) Suppose that the additional number of points +6 and the PROPOSAL that PLAYER A and PLAYER B agree on is 10.
   - o How many points did the PLAYER A earn?
   - o How many points did the PLAYER B earn?

3) Suppose that the additional number of points is 0; and the PROPOSAL that PLAYER A and PLAYER B agree on is 30.
   - o How many points did the PLAYER A earn?
   - o How many points did the PLAYER B earn?

4) Suppose that the both PLAYER A and PLAYER B did not accept any PROPOSAL within 1 minute.
   - o How many points did the PLAYER A earn?
   - o How many points did the PLAYER B earn?

5) What information is shown to you in the UPPER LEFT part of the screen?
   - o The number of points one PLAYER A earned in a previous round
   - o The PERCENTAGE of the total points earned by PLAYER A in *all* previous rounds
   - o A PROPOSAL agreed on by another PLAYER A and PLAYER B pair in a previous session
   - o The PERCENTAGE of the total points earned by PLAYER A in the previous round

6) What information is shown to you in the UPPER RIGHT part of the screen?
   - o The number of points one PLAYER A earned in a previous round
   - o The PERCENTAGE of the total points earned by PLAYER A in *all* previous rounds
   - o A PROPOSAL agreed on by another PLAYER A and PLAYER B pair in a previous session
   - o The PERCENTAGE of the total points earned by PLAYER A in the previous round

7) Suppose you see a PROPOSAL agreed to by another PLAYER A and PLAYER B pair in a previous session. Will you be able to tell if the additional number of points in that negotiation was either a) exactly the same as the additional number of points in your current negotiation or b) if it was one of any even number between -12 and +12.
   - o No
   - o Yes, by looking at the LOWER LEFT part of the screen
   - o Yes, by looking at the UPPER LEFT part of the screen
   - o Yes, by looking at the UPPER RIGHT part of the screen

8) Suppose your role is PLAYER A. Which of the following statements is true?
   - o You will be negotiating with the same person in the role of PLAYER B in all rounds
   - o You will be randomly assigned to negotiate with one of the persons with the role of PLAYER B in each round

9) Suppose your role is PLAYER B. Which of the following statements is true?
   - o You will be negotiating with the same person in the role of PLAYER A in all rounds
   - o You will be randomly assigned to negotiate with one of the persons with the role of PLAYER A in each round

Please wait for us to check your answers.

Appendix A2

Table A2.1 Tobit regression estimates of the effects of spillovers on the opening proposals, subject-specific random effects

	UNCORRELATED		CORRELATED	
Model	**1a**	**2a**	**1b**	**2b**
	b	**b**	**b**	**b**
Random effects				
σ^2 union players	6.344	6.615	6.467	6.472
	(1.400)	(1.389)	(1.320)	(1.320)
σ^2 residual	4.293	4.023	4.589	4.580
	(0.293)	(0.246)	(0.275)	(0.274)

Table A2.2 Linear regression estimates of the effects of spillovers on the divergence between union and firm proposals during bargaining

	All	UNCORRELATED	CORRELATED
Model	**1**	**2**	**3**
	b	**b**	**b**
Random effects			
σ^2 union players	23.960	22.589	15.782
	(5.996)	(9.689)	(6.668)
σ^2 firm players	2.992	2.903	5.127
	(1.043)	(1.776)	(2.571)
σ^2 negotiation	11.964	13.172	11.506
	(0.909)	(1.722)	(1.445)
σ^2 residual	10.956	10.965	11.278
	(0.225)	(0.376)	(0.377)

Standard errors in parentheses

Table A2.3 Logistic regression estimates of the effects of spillovers on non-agreement probabilities

	ALL	CONTROL	CORRELATED	UNCORRELATED
Model	**1**	**3**	**4**	**5**
	b	**b**	**b**	**b**
Random effects				
σ union players	0.541	0.486	0.473	0.710
	(0.196)	(0.357)	(0.398)	(0.374)
σ firm players	0.172	0.000	0.361	0.309
	(0.476)	(0.815)	(0.517)	(0.596)

Table A2.4 Linear regression estimates of the effects of spillovers on the value of the accepted proposals

	UNCORRELATED		CORRELATED	
Model	**1a**	**2a**	**1b**	**2b**
	b	**b**	**b**	**b**
Fixed effects				
Intercept	10.772***	13.721***	7.879***	9.144***
	(1.317)	(1.713)	(1.176)	(1.709)
Period	-0.165*	-0.184*	0.044	0.037
	(0.077)	(0.073)	(0.060)	(0.059)
Variable surplus	0.219***	0.205***	0.209***	0.199***
	(0.040)	(0.038)	(0.035)	(0.035)
Reference outcome = no agreement (dummy)	2.286	-0.410	3.445**	2.237
	(1.198)	(1.619)	(1.071)	(1.162)
Reference outcome	0.235**	-0.065	0.341***	0.213
	(0.087)	(0.163)	(0.079)	(0.161)
Reference outcome >12 (dummy)		-17.753***		-6.031
		(4.769)		(4.340)
Interaction				
Reference outcome*Reference outcome > 12 (dummy)		1.212***		0.105
		(0.319)		(0.419)
Random effects				
σ^2 union players	0.446	0.654	1.059	1.090
	(0.663)	(0.723)	(0.731)	(0.738)
σ^2 firm players	1.015	1.193	1.294	1.301
	(0.869)	(0.901)	(0.872)	(0.867)
σ^2 residual	11.294	9.940	8.618	8.474
	(1.510)	(1.345)	(1.074)	(1.056)
Model summary				
Wald χ^2 (df)	56.50(4)	77.30(6)***	91.33(4)***	94.88(6)***
Log likelihood	-364.012	-357.241	-396.165	-395.125
N	136		154	

Standard errors in parentheses

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; two-tailed; only reported for fixed effects

Appendix B

Table B1.1 Linear regression estimates of the effects on the divergence between union and firm proposals during bargaining, crossed subject-specific random effects and negotiation specific random effects (14 Periods)

	Model	
	1	2
Random effects		
σ^2 union player	15.502	15.473
	(2.703)	(2.698)
σ^2 (firm player)	2.287	2.272
	(0.561)	(0.558)
σ^2 (negotiation)	10.109	10.104
	(0.538)	(0.537)
σ^2 (residual)	9.990	9.268
	(0.141)	(0.140)

Standard errors in parentheses

Table B1.2 Linear regression estimates of the effects on the divergence between union and firm proposals during bargaining, crossed subject-specific random effects and negotiation specific random effects (13 Periods)

	CONTROL	UNCORRELATED	UNCORRELATED/ REPUTATION	CORRELATED	CORRELATED/ REPUTATION
Random effects					
σ^2 (union player)	38.003	21.405	7.100	17.937	8.191
	(17.413)	(9.267)	(2.631)	(7.540)	(2.788)
σ^2 (firm player)	1.406	2.526	1.250	5.924	2.631
	(1.113)	(1.647)	(0.768)	(2.898)	(1.075)
σ^2 (negotiation)	8.102	12.764	9.081	10.491	5.712
	(1.237)	(1.713)	(1.103)	(1.384)	(0.637)
σ^2 (residual)	9.102	10.604	9.091	11.412	8.485
	(1.237)	(0.373)	(0.258)	(0.391)	(0.237)

Standard errors in parentheses

Appendix C

Table C1.1 T-tests for difference in mean value in influence of different types of external information between union and firm negotiators

	Union – firm mean Δ	df	*t*-value	*p* two-tailed
Employment developments				
National	0.40	121	1.32	0.19
Sector	0.80	82.16	2.72	0.01
Local	0.64	121	2.08	0.04
Pricing developments				
International	-0.26	121	-0.87	0.38
National	0.18	121	0.56	0.58
Sector	-0.16	121	-0.48	0.63
Organizational indicators				
Militancy	1.43	121	4.66	0.00
Strike funds	0.29	121	1.32	0.19
Public opinion	0.01	121	0.05	0.96
Collective agreement developments				
International	1.41	121	0.85	0.40
National	0.07	121	0.31	0.75
Sector	-0.06	121	-0.24	0.81
Local	-0.09	121	-0.29	0.78
Comparable companies	0.48	121	1.54	0.13
Outcomes same collective agreement past	0.21	116	1.03	0.31
Outcomes collective agreements other companies same sector	0.47	113	1.83	0.07
Outcomes for collective agreements other sectors	0.31	108	1.37	0.17
Past readiness for industrial action	1.17	106	5.01	0.00
Readiness for industrial action other companies same sector	0.56	109	2.18	0.03
Readiness for industrial action other sectors	0.49	99	2.31	0.02
Past success of industrial action	1.00	96	3.74	0.00
Success of industrial action other companies same sector	0.50	105	1.93	0.06
Success of industrial action other sectors	0.51	95	2.26	0.03

Source: 2011 Dutch Negotiator Survey.

Table C1.2 T-tests for difference in mean value in influence of different types of external information between sector and company bargaining

	Sector – company mean Δ	df	*t*-value	*p* two-tailed
Employment developments				
National	0.33	121	1.05	0.30
Sector	0.50	121	1.67	0.10
Local	-0.72	121	-2.25	0.03
Pricing developments				
International	-0.24	121	-0.77	0.44
National	-0.33	121	1.02	0.31
Sector	-0.02	121	-0.06	0.95
Organizational indicators				
Militancy	-0.88	121	-2.64	0.01
Strike funds	-0.44	121	-1.95	0.05
Public opinion	-0.05	121	-0.19	0.85
Collective agreement developments				
International	-0.61	121	-2.30	0.02
National	-0.01	121	-0.06	0.95
Sector	0.01	121	0.04	0.97
Local	-1.88	105.74	-4.88	0.00
Comparable companies	-1.14	58.6	-3.22	0.00
Outcomes same collective agreement past	-0.24	114	-1.12	0.26
Outcomes collective agreements other companies same sector	-0.76	59.59	-2.68	0.01
Outcomes for collective agreements other sectors	0.45	108	1.90	0.06
Past readiness for industrial action	-0.77	106	-2.92	0.01
Readiness for industrial action other companies same sector	0.50	72.78	1.81	0.07
Readiness for industrial action other sectors	-0.29	51.61	1.22	0.23
Past success of industrial action	-0.51	96	1.69	0.09
Success of industrial action other companies same sector	-0.89	73.75	3.42	0.00
Success of industrial action other sectors	0.07	95	0.30	0.77

Source: 2011 Dutch Negotiator Survey.

Table C1.3 Bivariate correlations between influence of different types of external information and experience

	Spearman's ρ	*p* two-tailed	Pearson's ρ	*p* two-tailed
Employment developments				
National	0.04	0.68	-0.01	0.88
Sector	0.05	0.60	0.03	0.70
Local	0.17	0.06	0.16	0.09
Pricing developments				
International	0.20	0.03	0.18	0.04
National	0.10	0.25	0.15	0.10
Sector	0.10	0.28	0.12	0.20
Organizational indicators				
Militancy	0.16	0.07	0.15	0.09
Strike funds	0.08	0.37	0.03	0.71
Public opinion	0.02	0.79	-0.01	0.93
Collective agreement developments				
International	0.20	0.03	0.18	0.04
National	-0.05	0.56	-0.11	0.20
Sector	-0.06	0.49	-0.03	0.70
Local	0.10	0.28	0.04	0.70
Comparable companies	-0.11	0.22	-0.05	0.57
Outcomes same collective agreement past	-0.05	0.56	-0.08	0.39
Outcomes collective agreements other companies same sector	-0.03	0.72	-0.03	0.76
Outcomes for collective agreements other sectors	0.02	0.86	0.00	0.97
Past readiness for industrial action	0.02	0.85	0.00	0.97
Readiness for industrial action other companies same sector	-0.02	0.80	-0.02	0.85
Readiness for industrial action other sectors	-0.05	0.59	-0.02	0.82
Past success of industrial action	-0.06	0.53	-0.07	0.50
Success of industrial action other companies same sector	-0.10	0.29	-0.07	0.48
Success of industrial action other sectors	-0.17	0.09	-0.16	0.11

Source: 2011 Dutch Negotiator Survey.

Appendix D

Table D1 Types of impasses (non mutually exclusive categories[a])

	Frequency
Negotiations had to be stopped for union members consultation	34
Negotiations had to be stopped due to irreconcilable differences of opinion	30
The employer made a final offer	22
(One of the) union(s) issued a formal strike threat in the form of an ultimatum	15

[a] Bargaining events may exhibit more than one type
Source: 2011 Dutch Negotiator Survey.

Table D2 Issues that led to impasses (non mutually exclusive categories[a])

	Frequency
Predefined answering categories	
Regular wages	55
Overtime pay	6
Irregular hours pay	5
Variable pay	10
Leave	4
Working hours	16
Employment	4
Working conditions/working environment	5
Common issues mentioned in open answering fields	
Pensions	8
Various fringe benefits	8
Technical issues/bargaining procedure/application of the collective agreement	9

[a] Multiple issues may have existed
Source: 2011 Dutch Negotiator Survey.

Table D3 Correlation matrix for the influence on negotiators in the collective bargaining of nine types of information about other bargaining events, The Netherlands, 2011

	1	2	3	4	5	6	7	8
1 Outcomes prior contract periods								
2 Outcomes in the same sector	0.18							
3 Outcomes in other sectors	0.27**	0.52***						
4 Past readiness for industrial action	0.28**	0.36***	0.25**					
5 Readiness for industrial action other companies same sector	0.20*	0.52***	0.34***	0.54***				
6 Readiness for industrial action other sectors	0.21*	0.33***	0.50***	0.46***	0.66***			
7 Past success of industrial action	0.25*	0.36***	0.26*	0.82***	0.54***	0.49***		
8 Success of industrial action other companies in same sector	0.18	0.53***	0.23***	0.60***	0.78***	0.55***	0.70***	
9 Success of industrial action in other sectors	0.22*	0.28**	0.53***	0.40***	0.53***	0.83***	0.43***	0.53***

* Statistically significant at the 0.05 level (two-tailed);
** at the .01 level
*** at the .001 level.
Source: 2011 Dutch Negotiator Survey.

Table D4 Rotated component matrix, nine items measuring the influence of information about other bargaining events in collective bargaining in The Netherlands, 2011

	Component	
	1	2
Eigenvalue	4.71	1.24
Outcomes prior contract periods	0.12	0.36
Outcomes in the same sector	0.36	0.58
Outcomes in other sectors	0.06	0.87
Past readiness for industrial action	0.88	0.10
Readiness for industrial action other companies same sector	0.72	0.46
Readiness for industrial action other sectors	0.43	0.76
Past success of industrial action	0.91	0.15
Success of industrial action other companies in same sector	0.82	0.33
Success of industrial action in other sectors	0.35	0.75

KMO test = 0.74; Bartlett's test: χ^2=659.609; sig. 0.000
Extraction: Principal component; Varimax rotation with Kaiser Normalization
Source: 2011 Dutch Negotiator Survey.

Table D5 T-tests for differences between conflict and no conflict negotiators in mean value of reported influence of spillovers

	Conflict-no conflict mean Δ	df	*t*-value	*p* two-tailed
Outcomes same collective agreement past	0.33	119	1.59	0.11
Outcomes collective agreements other companies same sector	0.02	106	0.07	0.95
Outcomes for collective agreements other sectors	0.13	113	0.58	0.56
Past readiness for industrial action	0.56	111	2.18	0.03
Readiness for industrial action other companies same sector	1.00	103	2.27	0.03
Readiness for industrial action other sectors	0.49	104	2.30	0.02
Past success of industrial action	0.85	100	3.20	0.00
Success of industrial action other companies same sector	0.65	96	2.61	0.01
Success of industrial action other sectors	0.44	100	1.95	0.05

Source: 2011 Dutch Negotiator Survey.

Table D6 Ordered logistic regression estimates of the effects of different types of spillover on probability of experiencing conflict in collective bargaining (N = 112)

	Model 3		Model 4	
Independent Variables	**b**	**s.e.**	**b**	**s.e.**
Proximate conflict spillover	0.79*	0.31	0.67**	0.23
Distal and outcome spillover	0.015	0.19	0.25	0.35
Negotiator (dummy)				
Firm	Reference		Reference	
Union	0.23	0.49	0.24	0.50
Negotiator experience	0.06	0.05	0.06	0.05
Agreement (dummy)				
Company	Reference		Reference	
Sector	1.00[a]	0.58	1.01[a]	0.56
Number of employees covered by collective agreement	-0.00	0.11	-0.00	0.11
Economic sector (dummy)				
Primary	-0.18	0.95	-0.27	0.96
Secondary	Reference		Reference	
Tertiary	-0.02	0.49	-0.01	0.48
Quaternary	1.57*	0.78	1.60*	0.78
Proximate conflict spillover*union negotiator	-0.21	0.35		
Distal and outcome spillover*union negotiator			-0.14	0.45
Wald X^2	29.11		29.28	
df	10		10	
McKelvey and Zavoina's pseudo R^2	0.21		0.21	

[a] Statistically significant at the 0.1 level (two-tailed);
* at the .05 level
** at the .01 level
*** at the .001 level.
Source: 2011 Dutch Negotiator Survey.

Table D7 Ordered logistic regression estimates of the effects of different types of spillover on the probability of experiencing conflict in collective bargaining

Independent Variables	Outcomes		
	Past	Same sector	Other sectors
Logit for spillover measurement	0.21	-0.02	0.01
	(0.18)	(0.15)	(0.16)
Negotiator (dummy)			
Firm	Reference	Reference	Reference
Union	0.55	0.63	0.59
	(0.46)	(0.49)	(0.50)
Negotiator experience	0.02	0.03	0.02
	(0.05)	(0.05)	(0.05)
Agreement (dummy)			
Company	Reference	Reference	Reference
Sector	0.37	0.36	0.12
	(0.45)	(0.48)	(0.50)
Number of employees covered by collective agreement	-0.05	-0.03	-0.05
	(0.11)	(0.11)	(0.11)
Economic sector (dummy)			
Primary	0.10	0.14	0.27
	(0.73)	(0.78)	(0.72)
Secondary	Reference	Reference	Reference
Tertiary	-0.05	0.11	0.02
	(0.43)	(0.44)	(0.46)
Quaternary	2.20**	2.09*	2.51**
	(0.79)	(0.85)	(0.93)
Wald X^2	15.09	13.93	13.52
df	8	8	8
McKelvey and Zavoina's pseudo R^2	0.12	0.12	0.11
N	121	119	115

* Statistically significant at the 0.05 level (two-tailed); ** at the .01 level; *** at the .001 level
Cluster robust standard errors in parentheses.
Source: 2011 Dutch Negotiator Survey.

Readiness for industrial action			Success of industrial action		
Past	Same sector	Other sectors	Past	Same sector	Other sectors
0.39*	0.30*	0.56*	0.53**	0.40*	0.29
(0.17)	(0.15)	(0.25)	(0.18)	(0.18)	(0.19)
Reference	Reference	Reference	Reference	Reference	Reference
0.26	0.47	0.41	0.30	0.47	0.46
(0.51)	(0.46)	(0.49)	(0.55)	(0.47)	(0.47)
0.01	0.03	0.01	0.06	0.07	0.03
(0.05)	(0.05)	(0.06)	(0.05)	(0.05)	(0.06)
Reference	Reference	Reference	Reference	Reference	Reference
0.79	0.49	0.57	0.85	0.77	0.42
(0.55)	(0.49)	(0.63)	(0.62)	(0.54)	(0.57)
-0.05	-0.02	-0.03	-0.08	0.02	-0.03
(0.11)	(0.11)	(0.11)	(0.11)	(0.12)	(0.11)
0.35	0.13	0.11	0.25	-0.29	0.09
(0.80)	(0.79)	(0.74)	(0.91)	(0.91)	(0.71)
Reference	Reference	Reference	Reference	Reference	Reference
-0.11	0.10	-0.07	-0.11	0.02	0.08
(0.48)	(0.47)	(0.53)	(0.50)	(0.47)	(0.50)
1.72[a]	1.88*	2.24*	1.48	1.81*	2.63*
(0.94)	(0.74)	(0.96)	(1.08)	(0.73)	(1.02)
23.97	21.92	26.23	29.48	24.26	20.95
8	8	8	8	8	8
0.17	0.15	0.20	0.20	0.18	0.16
113	116	106	102	112	102

Summary in Dutch (Samenvatting)

Inleiding

Dit proefschrift richt zich op de vraag of, hoe en onder welke omstandigheden informatie over andere cao-onderhandelingen conflicten in cao-onderhandelingen beïnvloedt. Cao's bepalen de arbeidsvoorwaarden en werkomstandigheden van werknemers, de loonkosten van bedrijven, en zijn van grote invloed op samenlevingen. Hoewel het aantal stakingen tegenwoordig in westerse landen lager is dan in het verleden, is er nog steeds sprake van een aanzienlijke hoeveelheid cao-conflicten in deze landen. Tegelijkertijd neemt het aantal conflicten elders in de wereld toe, en lijken recente sociaaleconomische ontwikkelingen ook het risico op een heropleving van conflict in westerse landen te hebben vergroot (Kelly, 1998; ILO, 2013). Inzicht in de processen die cao-conflicten beïnvloeden is daarom van groot belang.

Dat verschillende cao-onderhandelingen elkaar beïnvloeden is bekend. Wetenschappelijk onderzoek heeft reeds veel inzichten opgeleverd in hoe onderhandelingsuitkomsten in cao's, met name loonafspraken, kunnen afhangen van informatie over wat er in andere cao's is afgesproken. Veel minder is echter bekend over hoe conflicten, zoals bijvoorbeeld stakingen of onderhandelingsimpasses, in cao-onderhandelingen worden beïnvloed door informatie over andere cao-onderhandelingen. In dit proefschrift bestudeer ik daarom de mechanismen die een dergelijke invloed kunnen verklaren. Dit doe ik aan de hand van experimenteel onderzoek waarbij ik gebruik maak van onderhandelingsexperimenten, en aan de hand van vragenlijstonderzoek onder cao-onderhandelaars in Nederland. Daarbij onderzoek ik zowel horizontale beïnvloedingsprocessen, waarbij onderhandelaars worden beïnvloed door informatie over onderhandelingen voor andere cao's, alsook verticale beïnvloedingsprocessen, waarbij onderhandelaars worden beïnvloed door informatie over onderhandelingen voor de eigen cao in het verleden.

Conflicten in cao-onderhandelingen, en arbeidsconflicten in het algemeen, zijn een domein van onderzoek van verschillende wetenschappelijke disciplines en subdisciplines, met name enerzijds de economie en anderzijds de sociologie en politicologie. Opmerkelijk is dat er hierdoor drie verschillende zienswijzen op de invloed van informatie over andere onderhandelingen op cao-conflicten bestaan. Binnen de economie moeten twee zienswijzen worden onderscheiden, welke beiden een beroep doen op onderhandelingstheorieën. In de orthodoxe economische zienswijze hebben onderhandelaars vaak geen beschikking over alle informatie die nodig is om conflicten te voorkomen. Kennis over andere onderhandelingen verbeterd hun informatie en verminderd zo de kans op conflict. In de gedragseconomische zienswijze zijn onderhandelaars vooral gericht op het behalen van uitkomsten die zij

als eerlijk en rechtvaardig kunnen beschouwen. De preferenties van onderhandelaars worden in deze zienswijze sterk beïnvloed door de onderhandelingsresultaten elders. Hierdoor kunnen de preferenties van de onderhandelaars aan werkgevers en werknemerszijde uiteen gaan lopen en zullen er conflicten ontstaan. De sociologische zienswijze doet een beroep op diffusietheorieën om de invloed van informatie over andere onderhandelingen op conflict te verklaren. In deze zienswijzen zijn werkgevers en werknemers tot op zekere hoogte in constante strijd verwikkeld en leidt informatie over conflicten in andere onderhandelingen middels diffusieprocessen tot verdere conflicten in andere onderhandelingen.

In hoofdstuk 1 zet ik elk van deze zienswijzen in detail uiteen. Ik begin daarbij met een overzicht van de ontwikkeling van de wetenschappelijke literatuur over arbeidsconflicten binnen de economie en sociologie, om vervolgens te beschrijven hoe deze ontwikkelingen geleid hebben tot verschillende zienswijzen op de invloed van informatie over andere onderhandelingen op conflict. Ik laat zien hoe de verschillen tussen de theoretische verklaringen van de invloed van informatie over onderhandelingen op conflicten tussen de economie en sociologie berusten op de fundamentele aannames die er in deze disciplines over arbeidsconflicten worden gemaakt. Binnen de economie worden conflicten, in navolging van Hicks (1932), gezien als niet rationeel omdat zij altijd kosten voor alle betrokken partijen met zich meebrengen. Binnen de sociologie echter is de, in de kern marxistische, opvatting gebruikelijk dat conflicten weldegelijk rationeel kunnen zijn omdat zij op lange termijn de positie van werknemers kunnen versterken. Hieruit volgt dat, terwijl economen aannemen dat rationele onderhandelaars conflicten zullen vermijden, sociologen juist aannemen dat rationele onderhandelaars voor conflict zullen kiezen, mits zij hiermee hun strategische positie kunnen verbeteren. Tevens laat ik zien dat verschillen binnen de economie in de zienswijze op de invloed van informatie over andere onderhandelingen op conflict te wijten zijn op verschillende aannames over de rationaliteit van het gedrag van actoren. De orthodoxe economie gaat uit van rationele onderhandelaars met onafhankelijke preferenties, die alleen voor conflict zullen kiezen omdat zij over onvoldoende informatie beschikken om tot vreedzaam resultaat te komen. De gedragseconomie maakt minder sterke aannames over de rationaliteit van onderhandelaars, door ervan uit te gaan dat hun preferenties afhankelijk zijn van referentiepunten, welke zij vaak op niet rationele wijze interpreteren.

Vervolgens laat ik zien hoe ik met dit proefschrift bijdraag aan de huidige kennis over de invloed van informatie over andere onderhandelingen op conflict door te werken aan een integratie van de economische en sociologische zienswijzen en deze systematisch te toetsen. Centraal staat daarbij de vraag hoe en onder welke condities informatie over andere onderhandelingen cao-conflicten beïnvloeden, en in hoeverre de verschillende theoretische mechanismen dit kunnen verklaren. Deze centrale vraag beantwoord ik aan de hand van vier specifieke onderzoeksvragen.

Het eerste deel van de rest van het proefschrift bestaat uit hoofdstuk 2 en hoofdstuk 3. Hierin behandel ik eerst de vraag welke rol rationele leerprocessen en sociale vergelijkingen spelen in de het ontstaan van onderhandelingsconflicten. Vervolgens behandel ik de vraag welke rol verwachtingen en reputaties spelen in het ontstaan van onderhandelingsconflicten. Deze twee vragen beantwoord ik met behulp van onderhandelingsexperimenten. Het tweede deel van dit proefschrift bestaat uit hoofdstuk 4 en hoofdstuk 5. Hierin behandel ik eerst de vraag in hoeverre cao-onderhandelaars beïnvloed worden door externe informatie en in hoeverre verschillen in deze invloed verklaard kunnen worden aan de hand van kenmerken van de onderhandelaars, kenmerken van de onderhandelingen, en kenmerken van de externe informatie. Vervolgens behandel ik de vraag in hoeverre de invloed van informatie over andere onderhandelingen de kans dat cao-onderhandelaars conflicten zullen hebben beïnvloedt. Deze twee vragen beantwoord ik aan de hand van een grootschalig vragenlijstonderzoek dat ik onder cao-onderhandelaars in Nederland heb uitgevoerd.

Deel 1: Experimentele toetsing van mechanismen uit de economische onderhandelingstheorie

In hoofdstuk 2 doe ik onderzoek naar twee mechanismen die (horizontale) beïnvloedingsprocessen tussen verschillende onderhandelingen kunnen verklaren en hun invloed op onderhandelingsconflicten. Het eerste mechanisme, sociale vergelijkingen, is ontleent aan de gedragseconomie. Hierbij wordt ervan uitgegaan dat de onderhandelingsresultaten in andere onderhandelingen referentiepunten vormen voor onderhandelaars, aan de hand waarvan zij oordelen over de eerlijkheid van mogelijke onderhandelingsuitkomsten in hun eigen onderhandeling. Onderhandelaars kiezen er echter voor om wel of juist niet naar andere onderhandelingsuitkomsten te kijken op basis van hun eigenbelang. Daardoor zullen onderhandelaars met tegengestelde belangen, zoals werkgevers and vakbondsonderhandelaars, door informatie over andere onderhandelingen verder uit elkaar gedreven worden, hetgeen in meer conflict resulteert (Babcock et al., 1996; Babcock et al., 2005).

Het tweede mechanisme, rationeel leren, is ontleent aan de orthodoxe economie. Hierbij wordt ervan uitgegaan dat vakbondsonderhandelaars niet weten wat het betalingsvermogen van de werkgever is. Onderhandelingsresultaten in andere onderhandelingen kunnen de vakbondsonderhandelaars echter helpen dit betalingsvermogen beter in te schatten. Hierdoor zullen zij hun looneisen matigen, wat tot minder conflict zal leiden (Kuhn en Gu, 1999).

Deze mechanismen toets ik aan de hand van een onderhandelingsexperiment. In dit experiment worden loononderhandelingen gemodelleerd als een verdeling van een som geld tussen twee mensen, waarvan er slechts een weet hoeveel geld er

precies te verdelen valt (de werkgeverrol), terwijl de ander dat niet precies weet (de vakbondsonderhandelaarrol). De deelnemers aan het experiment ontvangen informatie over de onderhandelingsuitkomsten van andere deelnemers. Deze informatie staat het de deelnemers altijd toe om sociale vergelijkingen te maken, maar alleen in sommige gevallen kunnen zij deze informatie ook gebruiken om rationeel te leren.

Ik analyseer vervolgens hoe ver de eisen van de twee mensen die met elkaar onderhandelen gedurende de onderhandeling uit elkaar liggen. Deze afstand gebruik ik als een maat voor conflict in de onderhandeling. De resultaten duiden erop dat sociale vergelijkingen inderdaad tot meer conflict leiden. Echter, wanneer rationeel leren mogelijk is, neemt de hoeveelheid conflict juist af. Dit laat zien dat zowel sociale vergelijkingen alsook rationeel leren ervoor kunnen zorgen dat informatie over andere onderhandelingen conflicten doen ontstaan of doen uitblijven in loononderhandelingen. Of dit leidt tot meer of juist minder conflict hangt ervan af of de informatie over andere onderhandelingen alleen middels sociale vergelijkingen van invloed kan zijn, of dat deze informatie ook rationeel leren toelaat.

In hoofdstuk 3 breid ik het onderhandelingsexperiment dat ik in hoofdstuk 2 heb onderzocht verder uit. Dit doe ik door sommige deelnemers nu ook informatie te geven over onderhandelingsuitkomsten die de deelnemers in de werkgeversrol in het verleden hebben behaald. Daarnaast analyseer ik de invloed van in het verleden behaalde onderhandelingsuitkomsten van de spelers in de vakbondsonderhandelaarrol. Dit doe ik om naast horizontale beïnvloedingsprocessen ook verticale beïnvloedingsprocessen te onderzoeken, dat wil zeggen de invloed van eigen onderhandelingsuitkomsten in het verleden op onderhandelingen in het heden.

Wederom is er sprake van twee potentiële mechanismen. Het eerste mechanismen bestaat uit reputatie-effecten. Dit houdt in dat kennis over de eerlijkheid van de werkgever op basis van wat de werkgever bij eerder onderhandelingen deed, van invloed is op het onderhandelingsgedrag op de vakbondsonderhandelaar in het heden. Zulke informatie kan namelijk gebruikt worden om een inschatting te maken hoe waarschijnlijk het is dat de werkgever een laag loon zal proberen te betalen, ook al zou deze een hoger loon kunnen betalen. Door deze onzekerheid te verminderen, kunnen reputatie-effecten ervoor zorgen dat er minder sprake van conflict is (cf. Bewley, 1999; Milgrom en Roberts, 1981).

Het tweede mechanisme bestaat uit verwachtingseffecten. Dit houdt in dat loonafspraken gemaakt in het verleden voor werknemers, een bijgevolg voor vakbondsonderhandelaars, verwachtingen creëren over toekomstige loonafspraken. Dit resulteert erin dat een loonafspraak gemaakt in het verleden een minimum aanvaardbare waarde worden voor volgende onderhandelingen. Wanneer werkgevers niet aan dit minimum kunnen voldoend kan dit resulteren in conflicten (Bewley, 1999; cf. Tversky & Kahneman, 1991).

Mijn analyse van deze uitbreiding van het onderhandelingsexperiment uit hoofdstuk 2 suggereert dat reputatie-effecten soms inderdaad tot minder conflict leiden, terwijl verwachtingseffecten soms juist tot meer conflict leiden. Er blijkt echter ook een complex samenspel te bestaan tussen horizontale en verticale beïnvloedingsprocessen. Zo versterkt de aanwezigheid van reputatie-effecten de conflict verlagende invloed van rationeel leren, maar verminderen zij juist de conflict verhogende invloed van sociale vergelijkingen.

Deel 2: Vragenlijstonderzoek onder cao-onderhandelaars in Nederland

In hoofdstuk 4 doe ik onderzoek naar de invloed van verschillende vormen van externe informatie op het onderhandelingsgedrag van cao-onderhandelaars. Daarbij kijk ik niet alleen naar informatie over andere onderhandelingen, maar ook informatie over economische, institutionele en organisatorische factoren. Ik analyseer de invloed van externe informatie met behulp van een vragenlijstonderzoek dat ik onder cao-onderhandelaars in Nederland heb gehouden.

In de kern beargumenteer ik dat de reden dat onderhandelaars beïnvloed worden door informatie over externe informatie gelegen is in het ontbreken van volledige kennis over alle relevante aspecten van hun onderhandeling, en daarmee gepaard gaande onzekerheid. Externe informatie wordt gebruikt om kennis over deze onzekere aspecten van de onderhandeling te verbeteren en zo onzekerheid te verminderen. Vanuit dit algemene theoretische raamwerk formuleer ik een vijftal hypothesen.

Ten formuleer ik de hypothese dat informatie over onderhandelingen van meer invloed zal zijn, naarmate deze informatie dichter bij de onderhandelaar staat en dus meer onzekerheid kan wegnemen. Dit zou betekenen dat informatie over onderhandelingen in het verleden van de een bepaalde cao (verticale beïnvloeding) meer invloed heeft dan informatie over onderhandelingen voor andere cao's (horizontale beïnvloeding) en dat informatie over cao's in dezelfde sector meer invloed heeft dan informatie over cao's in andere sectoren. Deze hypothese blijkt sterke steun te vinden in mijn empirische bevindingen.

Ten tweede formuleer ik de hypothese dat de vakbondsonderhandelaars meer beïnvloed zullen worden door externe informatie dan werkgeversonderhandelaars. Dat zou komen omdat zij minder goed dan de werkgever zelf kunnen inschatten aan welke looneis de werkgever kan voldoen, en omdat zij vaak de onderhandelingen met een initiële looneis moeten aftrappen. Daardoor zullen zij meer onzekerheid ervaren en bijgevolg meer behoefte hebben aan externe informatie. Ook deze hypothese wordt sterk gesteund door mijn empirische bevingen.

Ten derde formuleer ik twee hypothesen over de invloed van ervaring op de invloed van externe informatie. Enerzijds zou het namelijk zo kunnen zijn dat meer ervaren onderhandelaars met minder onzekerheid te maken hebben, waardoor zij

minder gebruik zullen maken van externe informatie. Anderzijds zou het echter ook zo kunnen zijn dat meer ervaren onderhandelaars juist geleerd hebben dat externe informatie een effectieve manier kan zijn om hun kennis over cruciale aspecten van hun eigen onderhandeling te verbeteren. De empirische resultaten bieden geen enkele steun voor de hypothese dat meer ervaring leidt tot minder invloed van externe informatie. Wel is het zo dat ervaren onderhandelaars soms juist meer beïnvloed worden door externe informatie. Echter, dit verband is zeer zwak en voor veel vormen van externe informatie geheel afwezig. Deze bevindingen duiden erop dat ervaring geen goede verklaring is voor verschillen tussen onderhandelaars in de mate van invloed van externe informatie.

Ten vierde formuleer ik de hypothese dat sommige vormen van externe informatie, namelijk informatie over economische factoren minder invloed op onderhandelaars in bedrijfstak-cao's zullen hebben dan op onderhandelaars in ondernemings-cao's. Deze hypothese leidt ik af van de theorie van Calmfors en Driffhill (1988), welke impliceert dat de economische context een minder belangrijk aspect is van onderhandelingen voor bedrijfstak-cao's dan van onderhandelingen voor ondernemings-cao's. Deze hypothese wordt niet gesteund door de empirische bevindingen.

Tenslotte formuleer ik de hypothese dat informatie over andere onderhandelingen van meer invloed is op onderhandelaars in ondernemings-cao's dan op onderhandelaars in bedrijfstak-cao's, wat vooral te wijten is aan Nederlandse onderhandelingscontext, waarin]een hoge mate van economische en strategische afhankelijkheid van bedrijfstak-cao's bestaat. Voor deze hypothese vind ik enige steun in de empirische bevindingen.

In hoofdstuk 5 onderzoek de consequenties van verschillen tussen cao-onderhandelaars in de mate van invloed die informatie over andere onderhandelingen op hen heeft op de kans dat deze cao-onderhandelaars met conflicten in hun cao-onderhandelingen te maken krijgen. Daarbij toets ik de implicaties van de orthodoxe economische, de gedragseconomische, - en de sociologische zienswijze op deze beïnvloedingprocessen. Wederom gebruik ik hiervoor het vragenlijstonderzoek dat ik onder cao-onderhandelaars in Nederland heb gehouden.

Op basis van de orthodoxe economische zienswijze formuleer ik de hypothese dat onderhandelaars die sterker beïnvloed worden door informatie over de onderhandelingsuitkomsten in andere cao-onderhandelingen, minder kans op cao-conflicten zullen hebben. Dat komt volgens de theorie (Kuhn en Gu, 1999) omdat deze informatie vakbondsonderhandelaars in staat stelt een betere inschatting van het betalingsvermogen van de werkgever te maken, en zij daarom minder geneigd zullen zijn om te hoge eisen te stellen.

Op basis van de gedragseconomische zienswijze formuleer ik de hypothese dat onderhandelaars die sterker beïnvloed worden door informatie over de onderhandelingsuitkomsten in andere cao-onderhandelingen, juist meer kans op cao-conflicten

zullen hebben. Dat komt volgens de theorie (Babcock et al., 1996, 2005; cf. Bewely, 1999) omdat onderhandelaars de uitkomsten van andere onderhandelingen gebruiken om te beslissen wat een rechtvaardige en eerlijke uitkomst van hun eigen, huidige onderhandeling zou zijn. Vakbondsonderhandelaars zullen daarbij geneigd om vooral te kijken naar andere cao-onderhandelingen waarin een relatief hoog loon is afgesproken, terwijl werkgeversonderhandelaars juist meer geneigd zullen zijn om te kijken naar andere cao-onderhandelingen waarin een relatief laag loon is afgesproken. Op deze wijze zullen de posities van de onderhandelaars onder invloed van informatie over andere onderhandelingen verder uit elkaar komen te liggen.

Mijn empirische bevindingen bieden noch voor de eerste, noch voor de tweede hypothese steun. Dit suggereert dat de economische theorie geen goede verklaring biedt voor de gemiddelde invloed van informatie over andere onderhandelingen op cao-conflicten, al zou zij in specifieke gevallen nog wel op kunnen gaan.

De derde hypothese die ik formuleer, leid ik af uit de sociologische zienswijze op de invloed van informatie over andere onderhandelingen op conflict. Hierbij geldt dat niet zozeer informatie over de onderhandelingsuitkomsten in andere onderhandelingen van belang is, als wel informatie over de actiebereidheid van werknemers en het eventuele succes van acties in deze andere onderhandeling. Ervan uitgaande dat de keuze om het op een conflict aan te laten komen soms rationeel kan zijn, maar dat er ook grote kosten aan conflict verbonden kunnen zijn, beargumenteer ik dat onderhandelaars die sterker beïnvloed door informatie over actiebereidheid en het succes van acties in andere onderhandelingen, een grotere kans op cao-conflicten zullen hebben. Immers, onderhandelaars zullen pas het risico van conflictueuze onderhandelingsstrategieën nemen waneer zij er met enige zekerheid van uit kunnen gaan dat de kosten van eventuele conflicten kleiner zullen zijn dan de opbrengsten van deze conflicten. De empirische resultaten van mijn onderzoek bieden sterke steun voor deze hypothese. De kans op cao-conflicten neemt duidelijk toe naarmate cao-onderhandelaars sterker worden beïnvloed door informatie over de actiebereidheid en het succes van eventuele acties in andere onderhandelingen.

Verassend genoeg blijkt dit effect even sterk voor vakbondsonderhandelaars als voor werkgeversonderhandelaars. Dit suggereert dat, omdat er nu eenmaal voor beide zijden geldt dat de keuze voor conflictueuze onderhandelingsstrategieën een risico op kosten door conflicten met zich meebrengt, beide zijden gebruik maken van informatie over andere onderhandelingen om deze kosten in kaart te brengen en op basis daarvan hun onderhandelingstrategie bepalen.

Slotbeschouwing

In de slotbeschouwing geef ik op basis van het onderzoek uit de voorgaande hoofdstukken een antwoord op de centrale vraag: Hoe en onder welke condities beïnvloed informatie over andere onderhandelingen cao-conflicten, en in hoeverre de verschillende theoretische mechanismen dit kunnen verklaren?

Ik concludeer dat de invloed van andere onderhandelingen voortkomt uit het ontbreken van volledige kennis bij de onderhandelaar over alle relevante aspecten van hun onderhandeling. Naarmate informatie over andere onderhandelingen relevanter is voor het verbeteren van deze kennis, zal zij meer invloed hebben. Daarbij is het zo dat respectievelijk vakbondsonderhandelaars en onderhandelaars voor ondernemings-cao's sterker beïnvloed worden dan werkgeversonderhandelaars en onderhandelaars voor bedrijfstak-cao's. Aspecten van de onderhandeling waarover onderhandelaars hun kennis trachten te verbeteren met behulp van informatie over andere onderhandelingen zijn bijvoorbeeld 1) het vermogen van de werkgever om aan looneisen te voldoen, 2) de rechtvaardigheid en eerlijkheid van mogelijke onderhandelingsuitkomsten, 3) de eerlijkheid van de werkgever, en 4) de kosten en opbrengsten van mogelijke cao-conflicten. Vooral dit laatste aspect blijkt belangrijk om de consequenties voor informatie over andere onderhandelingen op cao-conflicten te begrijpen. Dit komt overeen met de aannames van sociologische theorieën over arbeidsconflicten en diffusieprocessen maar werd tot op het heden nog niet onderkend in de economische onderhandelingstheorieën welke het onderzoeksdomein domineren.

Curriculum Vitae

Alex Lehr was born in Vlissingen (the Netherlands) on December 1st, 1982. He completed his secondary education at the Christelijke Scholengemeenschap Walcheren (CSW). In 2005, he started studying Sociology at Tilburg University, where he obtained his bachelor's degree in 2008. He obtained his master's degree at Radboud University in 2009, after writing his master thesis on evolutionist and naturalist worldviews, and their impact on religiosity and moral norms in the Netherlands. Between February 2010 and July 2014 he worked as a PhD candidate at the Political Science Department of Radboud University in the research program "Contagious Conflict. Learning from Industrial Conflict". During this period, he participated in the courses and activities of the Interuniversity Centre for Social Science Theory and Methodology (ICS). In 2013, he undertook a research internship with dr. Bernd Brandl at the University of York (United Kingdom) and carried out a research project on employers organizations for the International Labour Organization (ILO). Between August 2014 and October 2015, he worked as a lecturer and researcher at the Political Science department of Radboud University, where as of November 2015, he holds a position as Assistant Professor.

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For almost six years now, I have had the pleasure to work at the Department of Political Science of the Radboud University Nijmegen. I owe much to all the passionate, brilliant and altogether fun people that work there as researchers, teachers and as supporting staff. Thank you all for being the best colleagues I could wish for. My special thanks to Bertjan Verbeek and Marcel Wissenburg, who were and are great "bosses" to work for and with, and to Andrej Zaslove for providing some much needed perspective while I was finalizing this dissertation. Many thanks also to all the people at the Nijmegen School of Management (NSM)/Institute of Management Research (IMR) that supported and helped me over the years.

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